Graphite

Vol. VII. JANUARY, 1905. No. 1.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

COPY FREE ON REQUEST.

WE'RE COMING TO IT.

"In the field of power generation there is no longer a doubt as to the position of the internal-combustion engine. While its commercial success has been comparatively recent, yet this type of prime mover has gained such headway and made such giant strides, that it is no longer looked upon with suspicion by those who are unfamiliar with it, and with an apologetic air by those who are responsible for its presence."

The day may not be far off (who can tell?) when we will look upon the steam engine of 1905 only as a remarkable relic of the days when men used *pounds* of fuel, instead of *ounces*, to evolve a horse power.

We see great possibilities in the gas engine, and we firmly believe that the day is at hand when Dixon's Graphite will take front rank among all gas-engine cylinder lubricants. Flake graphite is the only adequate cylinder lubricant known to-day that will endure the terrific heat of internal combustion engines.

Steadily, surely, the world is awakening to the great possibilities of graphite lubrication.

A most serious mistake, and the one most often made in running a gas engine, is the lack of attention paid to its lubrication. All other things being equal, improper lubrication will cause more gas engine trouble than any other one thing.

You who have learned what gas engine trouble is, may find solace, comfort and peace of mind in Dixon's Ticonderoga Flake Graphite.

Dixon's Ticonderoga Graphite peculiarly recommends itself to the lubrication of air-compressor cylinders.

It cannot be volatilized by high temperatures and insures the ample protection of rubbing surfaces with a great reduction in the amount of expensive cylinder oils of high flash point.

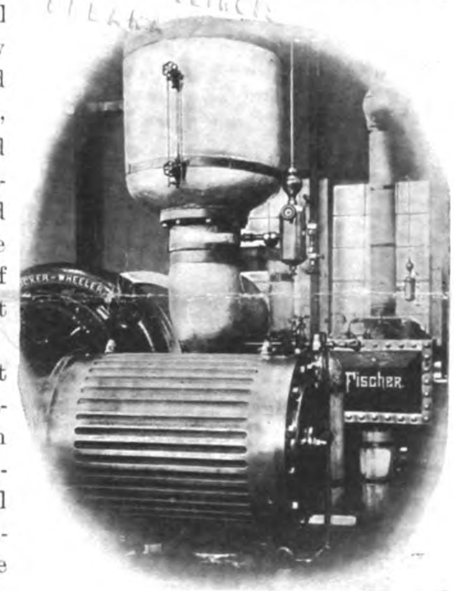
Graphite cannot be carbonized like a fat-containing oil and form a hard cake or scale to eventually choke air passages.

GRAPHITE IN THE CYLINDER.

How To Put It There.

The greatest obstacle to a more rapid growth of graphite lubrication has been the want of a satisfactory and reliable method of feeding it to valves, cylinders and bearings.

Many methods have been devised to this end—some for feeding flake graphite mixed with oil, some mixed merely with water, and still others dry. Tallow cups, manufactured and homemade cups, hand pumps and force-feed lubricators of all sorts and descriptions have been tried—some of them with excellent results.



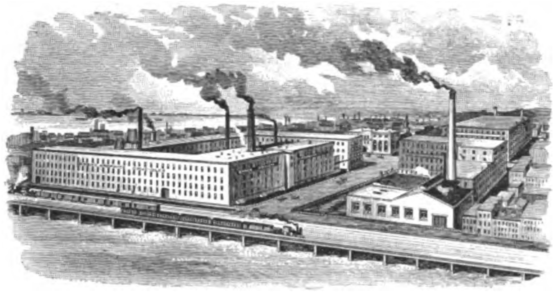
Graphite can not be held in permanent suspension in oil to feed successfully through an oil cup or sight-feed lubricator, and the Dixon Company has always urged engineers not to attempt introducing it in this way. The hand pump attached, as illustrated, has given good results on our own engines in connection with a regular oil supply. A little graphite and oil is thus forced into the steampipe upon starting in the morning and again at noon.

The tallow cup and homemade trick, depending on the drip of condensation for carrying the graphite into the valve, has given much satisfaction, it is true, but the method is uncertain, and, at best, haphazard. The force-feed lubricator, with agitating device to prevent settling, is a long stride in the right direction, and many of these devices are doing first-rate service to-day. But there is room, plenty of room, we are certain, for a good, positive, closely-regulated and reliable lubricator for feeding flake graphite to engine cylinders independent of oil.

In a vast number of instances, engineers would be glad to abandon cylinder oil largely if they had some reliable lubricator for dry graphite. Such a lubricator is being experimented with right now, and we hope to have further information for our friends before a great while.

ESTABLISHED 1827. INCORPORATED 1868.

D N TRADE MARK



JOSEPH DIXON CRUCIBLE CO.,
JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

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304 Market St., San Francisco. 26 Victoria St., London.

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Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

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Jersey City, N. J., January, 1905.

A LUBRICATION NUMBER.

Dixon begins the new year with a special issue of Graphite devoted to graphite lubrication. This number will be sent to thousands who are vitally interested in lubrication, in the hope of leading to a better understanding of the principles underlying the most effective use of Dixon's Pure Flake Graphite.

Graphite lubrication is not a mere theory up for discussion. It is a well-established fact of modern engineering, growing in importance every day.

Flake graphite is now almost invaluable to the engineer, yet the day of its greatest appreciation and triumph has still to come.

The advance of the internal combustion motor has hardly begun. Speeds, pressures and duty are steadily increasing. Lubrication methods must keep pace with machine and engine construction, and steadily, surely, the use of lubricating graphite increases, because it aids to better lubrication.

January Graphite can tell only a very little of the story, but to those who are desirous of studying this interesting problem we say that the Dixon literature is authoritative and comprehensive, and that we are always glad to supply free copies of our booklets to all who may be interested.

THE PRACTICAL ENGINEER.

We desire in this article to show a little of our appreciation for the operating engineer, the "man at the throttle."

The "boss" and the superintendent, the purchasing agent and manager, are commonly too engrossed with their own duties and plans to devote much thought and attention to the actual operation of their engines, their locomotives and their steamers. If all goes well little is apt to be thought, and less said, of the faithful man in grimy overalls whose knowledge and resource and skill keep the wheels turning from sun to sun. But let anything go wrong — be the cause what it may, the fault whose it may — and these afore-mentioned gentlemen come buzzing about the engineer's ears with protests and questions and complaints.

Often — it has come to our knowledge *so* often — a big mill engine or a locomotive is tied up just for the lack of a suitable lubricant that would have prevented that hot pin or cut valve.

Superintendents demand great results on little oil, purchasing agents too often buy what costs the least, and the engineer is too often "between the devil and the deep sea" to keep the wheels turning and "keep square with the boss" on the lubricant matter.

Engineers know all this and much more. It is they who have troubles — plenty of them, too — and they have had to cudgel their brains to find the cheapest, surest way out. Thousands have read advertisements of the marvels of graphite lubrication, have written for booklets and samples, either from general interest and too often in desperation. And they have found in Dixon's Flake Graphite a cure for their many troubles, have found "peace of mind," as one engineer recently expressed it. Sometimes, then, the "powers that be" have granted the engineer's requests and supplied the future needs for graphite; time and again the engineer has had to buy it out of his own pocket if he was to get it at all, and the number who have done this in times past is amazingly large.

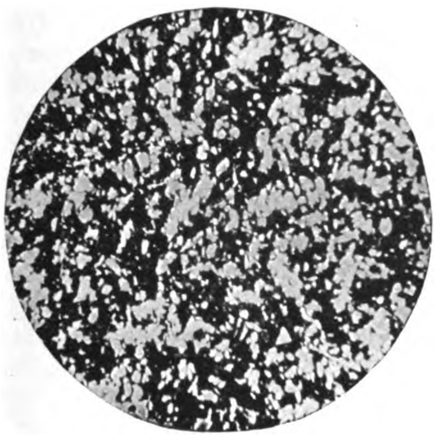
So graphite lubrication has grown, and it truly may be said to have come in by the engine room door.

The engineer has always been our very good friend, and we have in turn always done all we could to aid him, by careful attention to his letters, by free samples, by instructive booklets.

THE CAUSE OF FRICTION AND THE THEORY OF GRAPHITE LUBRICATION.

The resistance to free motion offered by surfaces in contact we call friction.

It is due solely to the roughness and unevenness of the surfaces in contact. Whereas it may be possible to produce what appears to the unaided eye as "a perfectly smooth surface" on metal, an examination under a powerful lens or microscope will invariably reveal a very different condition of affairs. When so magnified some metals appear granular, some lumpy, some crystalline in a variety of shapes and some quite fibrous.



Photograph of Babbitt Metal (magnified.)

The illustration shows a small area of an ordinary smooth "babbitted" surface, greatly magnified, emphasizing our major premise that "a perfectly smooth metal surface exists only in theory or imagination."

When two metal surfaces are brought into sliding contact these minute elevations and depressions interlock and resist free motion, the greater the pressure, the greater the resistance. If force be applied to surfaces thus in contact the irregularities of the surfaces must ride over one another or the minute projections be broken off. When this occurs we have continual abrasion and all of the energy thus absorbed is converted into heat.

Lubrication consists in separating the bearing surfaces by a layer of some other material, in machinery commonly an oil or grease thick enough to prevent the minute irregularities from even touching. The thicker or more viscous the lubricant, the thicker film will it form; but also the more viscous the lubricant the greater its own "internal friction." Oils and greases must not be too thick, especially where the speeds are high. It is a safe rule to follow to use the thinnest oil or grease that will keep the surfaces apart and keep the bearing cool.

A cardinal principle in lubrication, evident from the above is: "The smoother bearing surfaces can be made the less friction will be encountered and the easier will they be to lubricate."

This principle is emphasized by the action of flake graphite in filling up the minute depressions, roughnesses, and pores in metal surfaces, bringing them much nearer to a condition of perfect smoothness, which brings about a very great reduction in the "solid friction" between those surfaces. Graphite, with its strong tendency to attach itself to metallic surfaces, imparts a veneer of marvelous smoothness and great endurance that materially reduces the necessity of a thick oil film and effects a double reduction in friction.

This will be most readily understood from a glance at the following diagrams, which picture in exaggerated degree the condition of every bearing surface:

Fig. 1

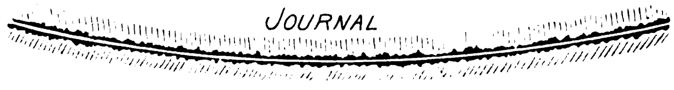


Fig. 2

Figure 1 shows ordinary friction surfaces, separated by a comparatively thick film of oil, while Figure 2 illustrates the manner in which graphite overlays the roughnesses, making a surface of exceeding smoothness that allows the use of a thinner lubricating layer.

Thus, in a word, the lubricating effect of graphite is to provide so perfect a surface that the oil film may be thinner and of thinner oil. Hence there is an apparent and logical reason for believing that flake graphite will reduce friction.

Graphite attacks Friction at its cause, whereas oils and greases are simply make-shifts to keep relatively rough surfaces apart, and that, in most cases, only indifferently well. It is when flake graphite and oils and greases are used together —the graphite to perfect the surfaces, the oils to provide the separating layer—that, in general, the best results are to be obtained.

A DISTINGUISHED VISITOR.

We had the pleasure, quite recently, of a visit from Henry M. Wells, Esquire, of Manchester, England. Mr. Wells is an oil manufacturer and a lubrication expert, devoting himself especially to the problem of cylinder lubrication.

There is now in progress at the Walker Engineering Laboratories, Liverpool, in conjunction with the Henry Wells Oil Co., a broad investigation of cylinder oils, begun two years and more ago. Hundreds of samples of oils have been procured in the open market and examined under a great variety of conditions, with the hope of arriving at some method of testing cylinder lubricants which can be taken as a true index of their value in service.

The results of these tests, a preliminary report of which has been published by Mr. Wells and his associate, W. Scott-Taggart, Esq., while very largely negative, do, nevertheless, contribute much valuable information to the sum of our knowledge upon the subject of cylinder lubrication.

The investigation is a worthy attempt to reach a scientific basis for judging the value of cylinder lubricants, and it is found necessary to prick many of the bubbles of empty talk on "viscosity at 212 degrees Fahr.," "flash point," "boiling point," "evaporation test," etc., so often employed by oil agents, as if they told the whole story. One conclusion is made very clear, namely, that the purchaser is almost wholly at the mercy of the oil manufacturer in buying or matching samples of oil, and the only way to discover the fitness of cylinder lubricants is to try 'em and see.

We wish Mr. Wells and his associates every possible success in furthering the cause of practical science, and heartily wish there were more men of his sort in this material generation.

WHAT DIXON'S FLAKE GRAPHITE HAS DONE AT SEA.

It has provided excellent cylinder lubrication where ordinarily no cylinder oil can be used.

It has kept the internal surfaces of marine engines in the best possible condition.

It has kept engines running smoothly and quietly under the most trying conditions of racing in heavy weather.

It has kept bearings and pins from overheating and cooled those that were already dangerously hot.

It has provided effective lubrication for thrust and tunnel shaft bearings when all else failed.

It has cured the lubrication disorders of the crankiest of pumps.

It has saved wear and tear of parts that would otherwise cause endless trouble and annoyance.

It has kept piston rods, plungers and stems round and true, saved packing and lowered friction.

It has saved overhauling and repairs and enormously reduced the anxieties of attendance that every marine engineer knows so well.

It *has done* these things.

POLISHED CYLINDERS.

Some Interesting Thoughts that Will Be New to Many Engineers.

In their admirable book, "Cylinder Oil and Cylinder Lubrication," referred to in another column of "Graphite," Messrs. Wells and Scott-Taggart bring out a point in correction of a wide-spread misunderstanding — so wide-spread, indeed, as to include many well-known writers upon engineering subjects. We refer to the bright polish often found on the walls of steam cylinders, and so generally accepted as an evidence of effective lubrication:

In order to satisfy themselves as to the working of an oil, most engineers open the cylinders at intervals and note the condition of the surfaces. Satisfaction is generally felt if they find the inside of the cylinder polished like silver, or if it has a bright, smooth surface, "like a mirror," as some express it.

Now, this is not by any means the condition the cylinder ought to be in if it be well lubricated. This statement may be considered a heresy by most people, but it is easily defended. Suppose an engineer found, on opening the cylinders of his engine, that bright streaks existed, he would conclude at once that the bright spots were the result of friction and insufficient oil had got to those places. This would be a perfectly natural conclusion; but, strange to say, if he found the whole surface of his cylinder polished, he would not for a moment think it was friction, rather otherwise, he would give credit to his lubricant, quite ignoring the fact that a cylinder is never polished brightly until friction does it when the engine is working. It is strange that, to many minds, friction in a cylinder is only associated with scratches or scoring of the surface.

As a matter of fact it is very seldom friction shows itself in this way; it is almost entirely displayed in a smoothing effect, especially if the metal is good. A well-lubricated cylinder ought to present a rather dark-looking surface, smooth, but with no signs of bright polish, even if coated with oil. The slightest rubbing with a polishing rag would produce a bright surface on such a cylinder, thereby proving that the lack of a polish is due to the absence of friction.

In addition to the "oil polish" referred to above, we have the smoothing and polishing effect produced in ammonia cylinders of refrigerating machinery, the "water polish" frequently observed in marine engines, and in pump cylinders, and the "graphite polish."

The water polish seems to be a thin, hard skin formed upon all the sliding surfaces of engines where the water of condensation furnishes the only internal lubrication. This gives remarkably smooth surfaces, but is rapidly lost if the engine is allowed to stand idle, as the polish rusts very quickly, resulting in more harm than good.

The "graphite polish" is different from any of the above. In the cases mentioned before, the polish is obtained by rubbing off the roughness of the grain of the metal. Graphite polishes by filling in the grain of the metal, just as wood filler and varnish polish a surface of wood, and so this cannot, like the other, be construed as an evidence of friction.

It takes considerable time to acquire an oil, or water, polish, and it soon rusts, cuts, or otherwise disappears. Not so with a surface finish supplied by flake graphite. It is easily obtained, easily maintained under all conditions, resists rust and corrosion, and is entirely unaffected by heat or moisture.

ECONOMY.

Dixon's Ticonderoga Flake Graphite offers the following economical features, which are worthy of the thought of every engineer:

Saves shut-downs.
Saves break-downs.
Saves time, money and labor.
Saves trouble.
Saves anxiety and constant attendance.
Saves wear and tear.
Saves many repairs.
Saves exhaust steam.
Saves coal.
Saves oil and grease.

"LET US PREY."

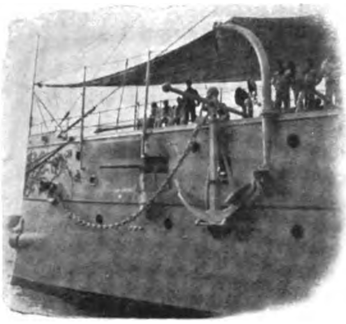
Why, please, in these days, when "knocking" is not supposed to be in good taste, does a reputable concern allow it to creep into its printed matter? And, what is still worse, why does the same reputable concern make use of Dixon testimonials and twist them to suit its own requirements?

It must be that in these days much printed matter in the way of advertisements, pamphlets, etc., is prepared by "experts" at so much per, and that these "experts" think they are serving their clients to good advantage, when, as a matter of fact, they are placing them in a false position.

We have before us a circular descriptive of a graphite which is offered as a lubricating graphite, and special pains seem to have been taken in this circular to knock flake graphite. Furthermore, a testimonial which came to the Dixon Company and which appeared in a leading technical paper, is taken, body and breeches, and used as a testimonial.

While it may not be exactly dignified for an old chap like Dixon to get up and spank some of these bad boys, it certainly seems likely to be necessary, and we are getting the wherewithal in hand.

U. S. S. "CONNECTICUT."



At just seventeen minutes past eleven o'clock, on the morning of September 29th, eighteen months after the laying of her keel, the United States battleship "Connecticut" took her natal plunge amid the waving of flags, the booming of saluting cannon and the cheers of a vast concourse of citizens.

There were several points of extraordinary interest connected with the launching of this vessel, chief among them being that the "Connecticut" is to be one of the most powerful fighting machines in the world, and that she is the largest vessel ever constructed in a government shipyard.

It is an historical fact, not undeserving of mention in this connection, that the "Connecticut" was launched from the very spot at which the old prison ship "Jersey" was beached, after she had performed her notorious duties during the Revolutionary war, and when the piling was being driven for building the ways, no little difficulty was experienced in getting it down through the remains of the sunken vessel.

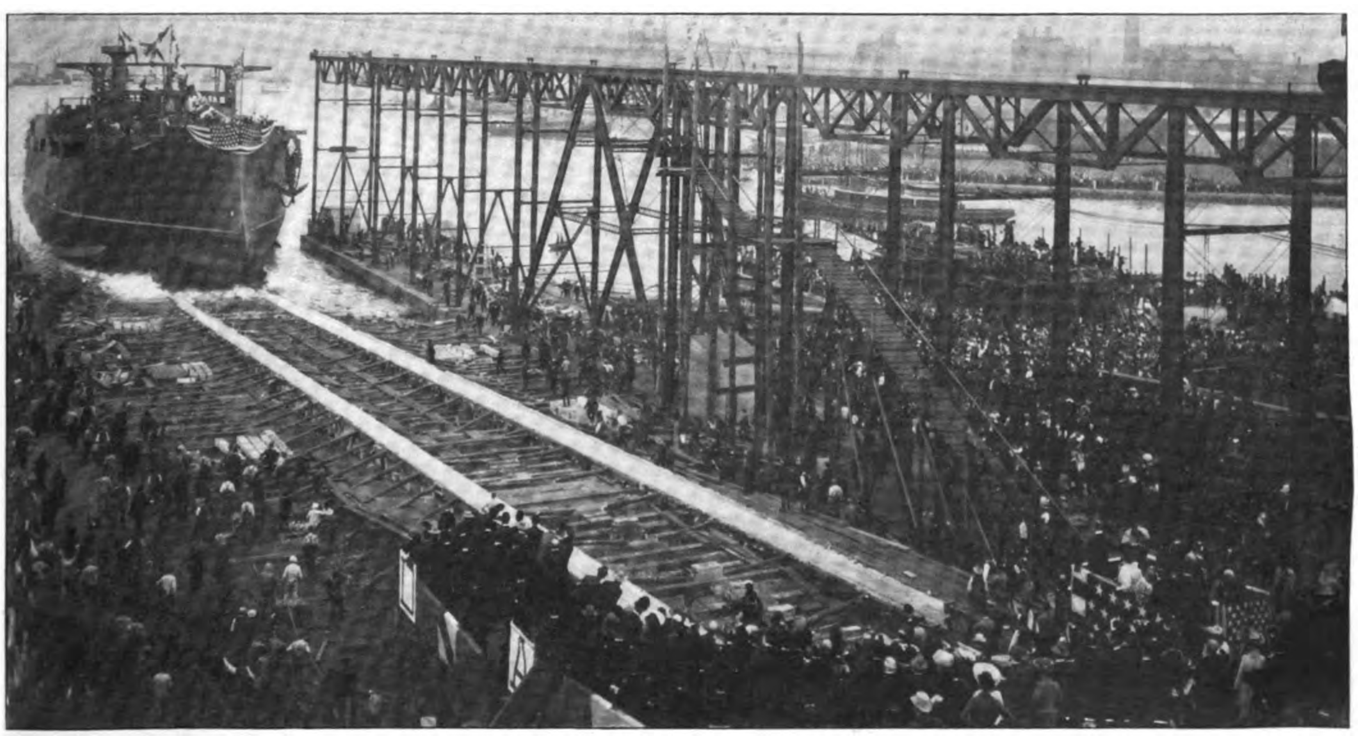
The ceremonies were almost marred by the failure of the battleship's fair sponsor to break the flag-bedecked champagne bottle, but, perhaps mindful of miscarriages at other launchings, a workman on the bow of the vessel was equal to the emergency. Seizing the tricolored lanyard from which the bottle was suspended, he crashed the latter hard against the prow, dubbing the boat he had helped to build "Connecticut," in phrase more explicit than Chesterfieldian, it is reported, but leaving no manner of room for Jack Tar's too ready superstition to look askance at an imperfectly christened ship.

No vessel could have moved smoother down the ways nor taken the water more easily. She seemed to gain her headway immediately, and slipped into the murky waters of the East River with not even a tremor or uncertain roll.

The readers of GRAPHITE will be interested in the lubrication of the ways of a great battleship. The ways themselves were two great rails, each built of four 12" x 12" yellow pine timbers securely bolted together, with a heavy flange timber on the outer edge. First a coat of candle grease was applied and this cooled very hard. On that a substantial layer of tallow and over this again a common yellow grease was thickly spread.

The final precaution was to dust Dixon's Ticonderoga Flake Graphite, the coarser flake—or No. 1, as we call it, thickly over the whole, by punching several holes in the bottoms of the familiar square tin cans and using them as one might use a giant pepper box. Undoubtedly graphite here simply played the part of insurance; if any chance had crushed out or scraped off the layers of soft grease and harder tallow, the plentiful supply of Dixon's Graphite on the slides of the cradle would have prevented sticking.

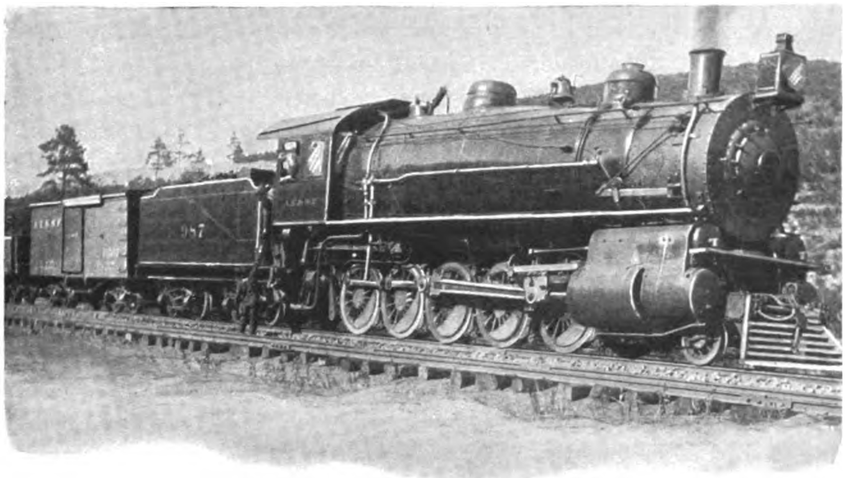
Another method of providing this "insurance layer" would be to paint the ways with plain boiled linseed oil and to dust graphite thickly on the sticky surface thus prepared. After the oil had dried, the graphite would be held securely, and the tallow and grease layers could be then applied as before. A year or so hence, when the "Connecticut" is put into commission, if we may judge from almost every other vessel in the United States Navy, Dixon's Graphite is going to figure in her smooth running as it did on this her first birthday.



JUST AS SHE STRUCK THE WATER.

LUBRICATION AND LOST WORK IN LOCOMOTIVES.

The leading editorial in the *Railroad Gazette* of September 23d, 1904, bore the above title and contained many general observations upon this attractive subject of lubrication that would interest every thoughtful reader.



Looking toward a solution of the problem of successful, reliable lubrication that will assure freedom from delays, breakdowns and excessive repairs, the editor directs attention to the growing approval of grease lubrication:

From an operating point of view, grease appears to be a success, but from a purely academic point of view, the arguments are not all favorable to its use. In all this, no wholesale condemnation of grease is intended. It is serving to keep locomotives on the road when many other things have failed, but its use is, nevertheless, a make-shift made necessary by conditions which the locomotive designer has not yet succeeded in overcoming by means which are more logical.

While grease appears to give great relief to those who have been troubled by flowing babbitt and scored box, it may not be the only means available. It is apparent, first of all, that there should be a better proportion of parts, the adoption of which would make unnecessary the present unusual means of lubrication. *So long as this cannot be accomplished, there yet remains the possibility of using graphite mixed in oil, which, if it can be supplied the journal with regularity and certainty, will not only insure the safety of the rubbing surfaces but effect a decided reduction in friction, even as compared with that obtained from oil. It is impossible to score a journal in the presence of good flake graphite.*

Here is the cream of the article: The impossibility of cutting, scoring and otherwise ruining bearing surfaces.

Oil lubrication alone never has been, never will be able to assure an entire freedom from the ruinous results of overheating of rubbing surfaces. Flake graphite stands alone as the only known lubricant revealed by practice and scientific research which can be relied upon to cure friction troubles and prevent them.

The locomotive probably offers greater difficulties to proper lubrication than any other class of machinery, and Dixon's Flake Graphite has rendered conspicuous service for many years on thousands of locomotives in curing hot pins and bearings, laboring, binding valves and cylinders, screaming, overheating air pumps and generally saving trouble.

A railroad simply cannot afford to be without a supply of Dixon's Flake Graphite.

There are many master mechanics and locomotive drivers who believe that there are many times when Dixon's Graphite is worth its weight in gold. Graphite never fails.

NOT MERELY FOR EMERGENCIES.

"In all classes of service for which graphite has ever been successfully employed, there are many evidences to show that it is no longer being regarded merely as a material for an emergency, but that it now has a place in the ordinary and usual routine of the day."

—Prof. W. F. M. Goss.

This certainly accords perfectly with the present increasing demand for Dixon's Ticonderoga Flake Graphite, upon which Prof. Goss based his statement.

THE TESTIMONY OF A VETERAN ENGINEER.

The following letter was received from a prominent member of the Brotherhood of Locomotive Engineers, in which he gives his impressions of the use of graphite. We refrain from mentioning this gentleman's name, but he is one of the large number of firm friends that Dixon's Flake Graphite has made in the locomotive service:

"Your booklets on the subject of graphite duly came to hand. Apart from the fact of their being an advertising medium, they contain much information that would be of value to all who use machinery, more especially locomotive engineers. I, as a locomotive engineer, over fifty years ago learned the virtues of black lead, or plumbago, as an effective agent in cooling a hot pin or journal on my engine. We used sperm oil in those days worth $2.50 per gallon. We were paid a percentage premium on what we saved on our allowance, viz., six quarts on a six wheel and eight quarts on an eight wheel connected engine for 100 miles. My oil record was always below all others, and I never either bought or stole a drop of oil, although I was accused of the latter. To say the truth, oil was not the only lubricant that I used, and, as I did my own oiling, and had a special hand can, no one ever knew it." E. J. R.

October 13th, 1904.

A PAINFUL ABSURDITY.

Time and chance have revealed some remarkable misunderstandings regarding the character and properties of lubricating graphite, but we have rarely had to refute any more absurd statements than were contained in a recent letter.

We had sent our correspondent samples upon request, and later followed the matter up with an inquiry as to the results shown by their application.

This astonishing reply rewarded our interest:

Nov. 2nd, 1904.

Joseph Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN: — Replying to yours, we would use some of

the material but are afraid our engineers would use it with cylinder oil. Experienced men inform us that if used with wet steam certain components separate, and after disintegration of the mass some of those components are resolved into a grit, which cuts out the cylinders.

Consequently we think best not to use the graphite where it is likely to get into cylinders, and prefer to confine our men to oil.

Thanking you for the sample, we are

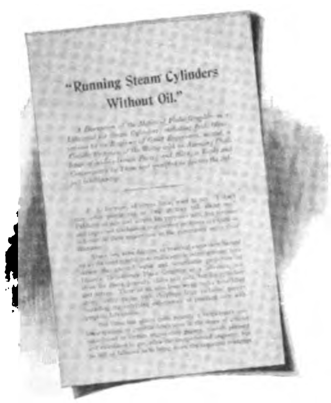
Yours very truly,
THE H. J. L. O. Co.

It would be shameful to expose the name of our correspondent, and we won't; but our readers will be glad to learn that we wrote a good long letter, explaining that graphite was a form of pure carbon which couldn't be disintegrated, etc. We patiently recited the truth of the theory of lubrication and its many practical benefits.

It's never too much trouble to set interested and fair-minded persons right.

We hope the H. J. L. O. Co. will listen as attentively to us as they did to the "experienced men."

CERTAIN OTHER "EXPERIENCED MEN."



From time to time we also hear about others, who profess to know their business, decrying the use of graphite for purposes of lubrication. Engineers have frequently appealed to us for scientific arguments to combat the statements of certain oil agents who think it's good business to abuse anything which at all subtracts from their sales of cylinder oils. Occasionally we have a "run-in" through the columns of the trades press with contributors who choose to abuse graphite lubrication thus openly and who dare the storm of protest which follows from north, south, east and west from practical men who have learned the value of Dixon's Flake Graphite.

Not long ago we accepted the challenge of an anonymous opponent in one of the engineering papers and wrote a lengthy reply. This, however, was not published, and we have printed the whole matter in full. This pamphlet is entitled "Running Steam Cylinders Without Oil," and a copy will be sent anyone interested in the subject of cylinder lubrication.

For breaking in new engines and machines, or running older ones, Dixon's Pure Flake Graphite has very successfully helped to solve many perplexing problems of lubrication, such as may any day confront the operator of any high speed, heavy-duty machinery.

It has been repeatedly shown that graphite greatly reduces friction and prevents abrasion.

PEACE OF MIND.

Not long ago we wrote to one of the officers of a California Division of the Brotherhood of Locomotive Engineers, forwarding him copies of "Graphite as a Lubricant" and "Oil vs. Grease" (two of our most recent publications), stating that if he desired any additional copies to distribute among the members of his local division we would be pleased to supply him.

The following letter needs no further comment:

"Your letter and printed matter setting forth the great benefits and peace of mind to be obtained by the use of flake graphite have been received and carefully read by me.

"I have used your graphite for many years, that is, when I could get it out of the storehouse. Sometimes they did not have much and would not issue it the same as other supplies; then I would 'swipe' it on account of the aforesaid peace of mind. I find it a great brain tonic, as well as for bearings and hot boxes.

"Yes, I will gladly distribute copies of your booklets to the members of our division; we have forty-one of them and I know that some need the relief that your medicine will give."

ON HIGH AUTHORITY.

Crystalline vs. Amorphous Graphite.

"The Production of Graphite in 1903," by Joseph Hyde Pratt (Extract from Mineral Resources of the United States, Calendar Year 1903, U. S. Geological Survey) contains some very interesting statements, lending the weight of high authority to a claim widely advanced by the Dixon Company.

We have constantly asserted the greater natural purity of crystalline graphite over amorphous graphite — purity not so much in percentage of carbon as in freedom from gritty foreign matter which renders such graphite unfit for purposes of lubrication.

We quote the following paragraphs literally:

Crystalline Graphite.—This variety can be used for all purposes for which graphite is required, but its chief uses are in the manufacture of refractory products, lubricants, electrotypes and pencils, for which it is especially adapted on account of its purity. * * * The refining of crystalline graphite is accomplished with but little difficulty, and the resultant product is usually very pure and free from any injurious compound.

Amorphous Graphite.—The occurrences of amorphous graphite are very much more abundant than those of the crystalline variety; but, on account of the difficulty experienced in refining the crude ore, many of these deposits are not, at the present time, of commercial value. * * * Schists are often impregnated with graphite to such an extent that they become graphitic schists. * * * Usually these schists contain also minute particles of quartz, and, although they may carry a very high percentage of graphite, it is impossible, in many cases, to obtain, commercially, a pure and marketable graphite. This is due, partly, to the intricate manner in which the grains of quartz and graphite are intermingled, which makes it almost impossible to separate the quartz completely from the graphite, even by extremely fine crushing.

Powdered quartz has not yet shown itself to be so good a lubricant that it can be used with anything but danger.

Use Flake (crystalline), not amorphous, graphite.

Remember the point, for it is a very, very important one.

DIXON's publications are sent free upon request.

GREASE LUBRICATION.

The Principles Underlying the Selection of a Suitable Journal Grease.

A few days ago, in the absence of the regular engineer, the automatic grease cup on the crank pin of one of our engines showed need of a slight repair.

When it had been replaced, after the repair had been made, it was filled with grease one grade harder than had before been used. After a short run, the pin was decidedly warm but not near the danger point. The temperature appeared to reach its maximum after an hour or so and maintained that temperature during the run. The grease was not changed in the cup and the next day the same thing happened. At noon of the second day the grease was removed and the cup filled with a grade which had previously been used. From the time of starting up, there was a gradual decrease of temperature during the afternoon, and when six o'clock came the pin was cold.

This case is a typical one and indicates clearly the principles which underlie the subject of grease lubrication.

For purposes of illustration, let us assume three bearings, A, B and C, identical in size, velocity, pressure and condition of surface, and which, with the same lubricant, would give similar results. On A, a soft grease is applied; on B, one of medium hardness, and on C, a grade which is hard and stiff. After running for a period of time, it is noticed that A and C have warmed up somewhat, while B is still at the normal temperature of the surroundings. A continuation of the operation results in a continued increase of temperature in the bearing A, perhaps to the point of cutting, while the bearing C increases to a temperature more or less above that of the room, and the bearing B has remained cool.

The cause of heating in A and C is, of course, friction; but this friction is of a different sort in the two bearings. In the first case the lubricant is not sufficiently heavy-bodied to keep the bearing surfaces apart, and the heat developed is that due to metallic friction. The least increase in temperature reduces the viscosity of the lubricant, thus increasing the tendency to heat. An increasing rate of wear is followed by roughness of the parts, and finally by more or less serious abrasion; but in the case of the bearing C the heat developed is not due to metallic friction, because the lubricant is heavier and more viscous than that on bearing B, which still remains cool. So it is evident that the heat is the result of internal friction between the particles of the lubricant itself.

Any increase of temperature reduces the viscosity of the lubricant and with it the tendency to heat further, which is contrary to the case of journal A, where a similar decrease of viscosity increases the tendency to heat.

Any increase in the temperature also increases the rate of radiation, and these two influences bring the bearing to a constant temperature more or less above that of surrounding atmosphere.

All lubricated bearings fall into one of the three classes described. Bearings which run cool need no serious consideration; but when bearings run hot we must determine whether the lubricant is too soft or too hard. It is a fair statement to make that that lubricant is best which is least viscous, yet sufficient to keep the metallic surfaces apart.

But, in order to be safe, a grease is chosen considerably harder than will give the best results. The result is that bearings run constantly a little warm, which, of course, means loss of power. But there is a better way to get this margin of safety, and that is by the addition of Dixon's Flake Graphite to the lubricant. Its presence prevents any possibility of metallic contact, no matter how thin the lubricant becomes. It increases the smoothness of the frictional surfaces far beyond that of the finest machine work. It is an insurance against shut-downs and a saver of power.

DIXON'S FLAKE GRAPHITE PREVENTS A SHUT-DOWN.

We received the following letter from Mr. J. R. Harrigan, General Manager of the Columbus, Buckeye Lake and Newark Traction Company, of Newark, Ohio, with permission to print same. We know it will interest our readers and we sincerely thank Mr. Harrigan for his kind permission to publish:

NEWARK, Ohio, June 24, 1904.

Joseph Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN:—We have had considerable trouble with our Hamilton-Corliss engine for the past year, due to the fact that the connecting rod was found to be slightly twisted when installed. We were unable to ascertain the trouble for some time, and the engine has been constantly giving us more or less trouble. As soon as the trouble was found we renewed the rod, but we experienced a good deal of trouble with our cylinders cutting.

We purchased a keg of your flake graphite and have been using it for the past two weeks awaiting the arrival of the engine people to re-bore the cylinder, and it is the only thing that has kept us from shutting down our plant. We find it is giving us excellent results.

Yours truly,

COLUMBUS, BUCKEYE LAKE & NEWARK TRACTION CO.

(Signed) J. R. HARRIGAN, Gen'l Mgr.

FLAKE GRAPHITE FOR HOT BEARINGS.

We received a letter from Mr. John Schauer of Strausse, Pa., requesting information regarding the usefulness of Dixon's Flake Graphite for cooling hot bearings. He stated that during the hot weather he experienced the greatest trouble with the overheating of the bearings of the cylinder of his threshing machine. We sent him a sample of Dixon's Graphite and the following letter is eloquent of satisfaction:

STRAUSSE, Pa.

GENTLEMEN: — The sample was received and I must tell you that it worked like magic.

I applied the graphite as directed and I believe that I can now run my machine half a day without stopping; before I had the graphite, I often had to shut down every fifteen minutes on account of hot bearings. Let me thank you for sending the sample, as it worked wonders for me, and I shall never again be without a supply of Dixon's Ticonderoga Flake Graphite.

Flake Graphite for Axles.

The driver or owner of a wagon doesn't have to give as serious thought to the matter of lubrication as the engineer, but he is too wise to neglect it. Engineers the world over have long since recognized the value of Dixon's Graphite as a lubricant.

The vital ingredient of Dixon's Everlasting Axle Grease is the famous flake graphite mined only by the Dixon Company in Ticonderoga, N. Y. This graphite works into the pores of the metal of the axle and box, giving them a high mirror-like polish that cannot rust or corrode or wear. This graphite glaze makes overheating and cutting impossible, even if the greasing is accidentally neglected.

Dixon's Graphite Axle Grease is a high grade grease, carrying a generous amount of flake graphite. It is waterproof and never turns rancid, nor gums, nor shrinks. It never becomes soft enough to run or drip in hot weather nor stiff enough to make the wheels turn hard in winter.

A little goes a very great way; so far, in fact, that only occasional greasings are necessary for any vehicle, and, pound for pound, it will far outlast any other axle lubricant the market affords. For this reason alone it is considerably cheaper than ordinary greases or castor oil.

Try a little and keep a tally of the great number of miles a wagon will go on one pound of Dixon's Graphite Axle Grease. You will be as pleased as you are surprised at the endurance of this grease.

GRAPHITE ON LATHE CENTERS.

A constant source of annoyance to machinists is the cutting of lathe centers in spite of liberal use of the oil can at this point.

A little of Dixon's Flake Graphite, applied when the work is put into the lathe, will afford perfect lubrication and will last perfectly well for several hours.

A stick of Dixon's Cycle Chain Graphite would be fine for this, or perhaps a lump of tallow and flake graphite would answer.

SUPERHEATED STEAM.

Its Bearing Upon the Problem of Cylinder Lubrication.

Testing engineers have variously estimated the gain in steam engine efficiency from superheating at 10 to 25 or 30 per cent.

Naturally enough the gain depends largely upon the degree of cylinder condensation previously occurring in the individual steam plant, and, within certain limits, it has been established that the improvement in efficiency due to superheating is in direct ratio to the amount of superheat.

Before the days of mineral oils of high flash point, lubrication in the presence of steam at these higher temperatures proved, in most cases, a nearly insurmountable difficulty; and to-day, despite the advancement of oil-refining methods and knowledge, whereby our heavy cylinder oils are produced, the difficulties are by no means all overcome.

The comparative degree of viscosity or body of oils at 212 degrees Fahr., a favorite theme of oil agents, although, like charity, "covering a multitude of sins," bears little relation, as has been clearly shown, to the body of these oils at 300 or 350 degrees. As a matter of fact, most cylinder oils that at 212 degrees possess excellent body, are at 350 degrees exceedingly limpid and watery.

No engineer would feel much confidence in a watery lubricant's keeping the surfaces of piston and cylinder, or valve and valve face apart, and, as a matter of fact, lubrication, under these conditions, has usually been very imperfect.

Dixon's Ticonderoga Flake Graphite offers a very practical aid in solving this problem of cylinder lubrication in the presence of superheated steam. Under some conditions it may be used without any other lubricant for valves and cylinders; under any conditions it is beneficial. By its use a new surface, smooth and "frictionless," is put upon cylinder walls and pistons, a glaze or veneering of graphite which takes the brunt of the friction and wear.

If renewed, from time to time, flake graphite prevents cutting and the other manifest results of dry surfaces.

When cylinders and valves have a graphite polish, they are very much easier to lubricate and the benefits and improvements are instantly apparent.

Graphite, unaffected as it is by temperatures far higher than any degree of superheating, remains upon valves and cylinders and does its wonderful service under conditions where oils have failed entirely. The lubrication problems involved in the use of high pressure and superheated steam, strongly emphasize the famous qualities of Dixon's Ticonderoga Flake Graphite.

GRAPHITE ON BLOW-OFF VALVES.

It is the little things which count, and where the little troubles are cured, the bigger matters seem to take care of themselves. Here is an interesting case in point which may help some engineer out of a little trouble and annoyance:

"Some years ago I used to have trouble with my blow-off cocks leaking after I had them open to blow some of the dirty water out of the boilers, and I had to put in a new cock about every three months, and naturally my employers started to kick. I decided to try a method which would do away with the cock being cut from the scale and leaking

after they had been open. The next Sunday when I cleaned boilers I removed the plugs or keys from the cocks and covered these with graphite mixed with a little cylinder oil and then put them back and left them closed for a few days. When next I opened the cocks to blow some of the dirty water out of the boilers and closed them, to my surprise they did not leak at all. When I cleaned the boilers again I removed the plugs from the cocks again and found that the graphite had filled up the places which were cut by the scale. This stopped them from leaking. Now every time I clean boilers I cover the plugs with graphite, and I have not put in a new cock for fourteen months, while the cocks open much easier than before I used the graphite."—H. J. E. in *Engineers' Review.*

THE STORY OF BABBITT METAL.

Every engineer uses babbitt. Every engineer and mechanical man uses the name "babbitt" with perfect familiarity, but we believe that few really know where the name originated or anything further about it. Therefore the following clipping should prove of interest to the readers of GRAPHITE:

Although Isaac Babbitt was the inventor of the method of using soft metals in journal boxes, his patent specification makes no claim on the alloy itself, but simply an the method of holding the soft metal in place, says the *Metal Industry.* Isaac Babbitt was born in Taunton, Mass., on July 26, 1779. He learned the trade of goldsmith, and in 1824, in his native town, made the first britannia ware produced in the United States, but this enterprise proved unsuccessful. He then removed to Boston and entered the employ of the South Boston Iron Works, and in 1839, while an employe of this establishment, he produced the invention which has perpetuated his name. For this invention he was given a gold medal from the Massachusetts Charitable Mechanics' Association, and afterward Congress grant ed him the sum of $20,000 as a reward. In 1844 the invention was patented in England and in 1847 in Russia. After devoting some time to the production of metals, he engaged in the manufacture of soap, so that his name has become almost a household word. He died insane at the Mc. Lean Asylum, Somerville, Mass., on May 26, 1862.

The fact that in the patent specification no claim is made for the alloy, is sufficient to dispel the ordinary belief in this direction. Britannia metal, pewter or an alloy of tin, fifty parts; antimony, five parts, and copper one part, are recommended. The latter alloy is somewhat softer than that now known as "genuine babbitt," which is commonly composed of tin, ninety-six parts; antimony, eight parts, and copper, four parts. The original idea in the use of a soft metal was practically the same as it is now; *i. e.*, to make a bearing which would conform to the surface of the axle. It is natural, then, that the alloys used to-day are somewhat harder than the original material employed. It is also natural that the same Isaac Babbitt should have been handed down to posterity as the inventor of the alloy, although, of course, quite erroneously.

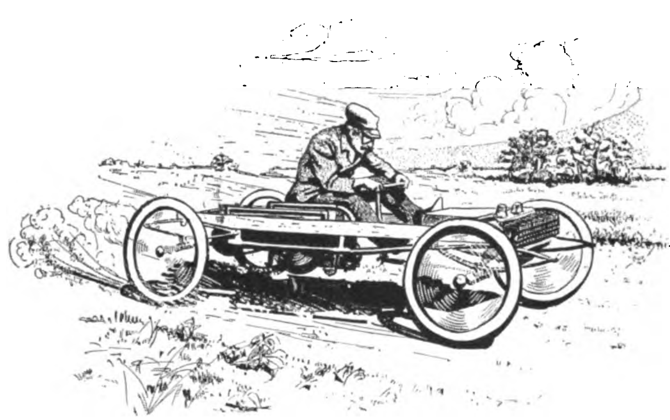
DIXON'S graphite publications are sent free of charge to all who are interested in the many uses of graphite.

AN INTERESTING LETTER.

The following letter from Mr. John C. Kennedy, purchasing agent of the Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn., is interesting in a historical sense, as well as bearing on the "Lead Pencil Test" on page 360 of GRAPHITE for June, 1904:

I wish to call your attention to a test I saw made in our engine room the day after reading your article. In 1844 Mr. Polk of Tennessee was elected President of the United States. The next Congress passed an act to build a navy yard in the interior of the country, where foreign vessels could not safely reach it. Memphis, Tenn., was selected as the site or place at which to build it. It was built and one double horizontal engine, 14" x 42" cylinders, both connected with the main shaft, making 58 strokes per minute, was put in to run the machinery. When the war between the States commenced, the Confederates took these engines to Nashville and put them into a gun factory. When the Federals, after the fall of Donaldson, took the engines from the works and took them to the railroad shops, where they were used until 1865. They were then put up at auction by the U. S. Government and were bought by the N. C. & St. L. Ry. When our new shops were built they were put in to drive all our machinery in the engine shop, and by rope transmission the boiler shop and blacksmith shop, and are running 23½ hours out of 24, 365 days in the year. I saw the engines here a few days ago while I was showing some visitors through the works, and taking a nickel out of my pocket and standing it on edge on the bed plate, and there it stood and was standing there when we left the engine room.

Do you not think this a more severe test than the pencil test?



MORE SPEED
SMOOTHER RUNNING
GREATER POWER
LESS WEAR
FEWER TROUBLES
SMALLER REPAIRS ?

Then try Dixon's Graphite and rejoice, as others have rejoiced, in its immediate benefits.

Our illustrated booklet, "Graphite for the Motor," tells its own story quite clearly. A copy for the asking.

The regular use of Dixon's Flake Graphite will save oil and coal, but more than all else, the worry of "friction troubles."

LIVING IN A FAVORED ERA.

Geyer's Stationer, in its report of the Stationers' Convention, says:

"The Chicago Stationers' Association did itself proud. Never, in the history of the trade, has there been such a gathering of its members; never such an exhibition of enthusiasm. From the Twin Cities of the North to New Orleans in the South, from Boston to San Francisco the most prominent representatives of the trade gathered here."

Mr. John A. Walker, Vice-President, Treasurer and General Manager of the Joseph Dixon Crucible Company, was the only pencil manufacturer present. Mr. Walker had declined the invitation to attend for the reason that it seemed impossible for him to go to Chicago and return in time to catch his steamer for Europe, where it was necessary for him to go on important business.

The introduction by President Gibbs will show why Mr. Walker finally consented:

President Gibbs—Gentlemen: I want to introduce Mr. Walker to you—John A. Walker, the Vice-President of the Dixon Crucible Company of Jersey City, New Jersey. I would also like to add that Mr. Walker was on the eve of leaving for Europe when he received a telegram from me, requesting as a particular favor to the Chicago Stationers' Association that he be present at this banquet. He gave up important business to come here. He arrived here yesterday, and he leaves to-morrow to catch his steamer. (Applause.)

John A. Walker—Mr. Toastmaster and Gentlemen: In this exciting and enthusiastic and inspiring presence, it seems to me fair to remind you that we are all living in a favored era. We are living in a time that the prophets and seers and philosophers of the past all looked forward to, the days that they dreamed about, the days that they wondered whether would ever come, and it is our lot to live under these skies. In addition to this, in addition to the favored era, we are living in the most favored land on the globe. The sun does not shine in these favored days on so fair and so bright a land as our lot is cast in. In the old days the head man was a soldier. The necessities of the case then brought the soldier to the front. Fighting was the business of the day, and the soldier was the foremost man. He was the most honored man. He was the man of honor. He was the man upon whose shoulders they put the responsibility, and after a while his day went by. And then for many long centuries the priest was the man who held the power, and held the power because in him was all the learning of the day. He knew all the things that were known in those days, and he held sway and power over the people by force of his accumulated learning and the power of his intellect. And after a long, long, weary time, the day and the sway and the power of the priest went by. And then came the day of the lawyer, and that signified progress, because in the day of the soldier men fought for their rights, and in the day of the lawyer his head came in to teach men to interpret their rights, and to fix them by interpretation instead of fighting. And in due time his day went by. And now in this favored era, the foremost man, the man who is at the front in all quarters of the globe, is the business man, the man of affairs. The Emperor of Germany, for instance, is a business man. The Russian people are on their way to Manchuria, or on their way back, whichever it is, for the purpose of business. (Laughter.) It was a business enterprise that sent them there, and the business man is at the front. And in the development of business, organization is the function of the business man, and I simply have to say in the few remarks that I make here, that we are all to be congratulated that this organization has been perfected here, that it has been perfected with so little friction, that so many interests have been embraced, that we have fallen into the spirit of the time; that the elevation of the business has brought about the gathering together of this fine body of men all in one guild, all in one fraternity, and has fused them into one society for the purposes of their own protection and for the purposes of progress, and for the dissemination of knowledge and for minimizing the friction that occurs in the business world. And I will close, gentlemen, by saying that I congratulate you all on this perfection and on the minimum of friction with which it has been attained, and the prospect of success which seems to loom up before us. (Applause.)

The Toastmaster—I wish to say to Mr. Walker that we fully appreciate his presence this evening, and his having come from such a long distance.

GRAPHITE AS A LUBRICANT.

Ninth Edition.

The theory and practical benefits of graphite lubrication cannot be explained in a word. The subject is one which is not only interesting and worthy of careful study, but which requires intelligence to obtain the best results.

Throughout the several chapters of the book illustrated above we have endeavored to clearly set forth the scientific aspects of the subject and briefly to relate some of the principal advantages as shown in practice upon many different classes of engines and machinery.

Our chief aim has been to give this book a practical value to practical men, to make it instructive and truthful, claiming nothing which time and experience have not amply approved.

We shall be pleased to forward a copy of "Graphite as a Lubricant" to every one interested in lubrication. 52 pp., illustrated.

TRY GRAPHITE.

Test the value of Dixon's Ticonderoga Flake Graphite on your most troublesome bearing and be convinced that it offers, as we claim, the practical solution of the most difficult problems in lubrication.

GREASE IN BOILERS VS. GRAPHITE IN BOILERS.

The importance of excluding grease from the water side of heating surfaces of a boiler cannot be too strongly commented upon. While it is well known that scale is very injurious to the boiler, it is, according to one writer, not nearly so injurious as grease. For instance, it is stated in a paper read before the Institute of Naval Architects in England, that, roughly speaking, a film of lubricant 1-100 of an inch, a layer of scale 1-10 of an inch thick, and a steel boiler plate 10 inches thick, offer equal resistance to the passage of heat; that is, grease offers about 1,000 times and scale about 100 times the resistance to the transfer of heat as would a steel plate of equal thickness.

This is not merely interesting to engineers, but important as well, as it represents what may, with careless handling, result in an almost appalling waste of coal, if not in bagged boiler plates and spots burning out, followed by scalding of the firemen or a disastrous explosion. No engineer who knows anything needs to be told that, as far as it is humanly possible to do so, grease must be kept out of boilers.

That means, of course, one of three things: (1). Extract all oil from exhaust steam. (2). Don't attempt to use exhaust steam for boiler feed. (3). Quit using cylinder oil in excess of what you can eliminate.

1. Some day someone may invent an eliminator, or extractor, or separator, or filter that will not allow any grease or oil at all to get into the boilers; but, so far as we know, nobody has done this yet.

2. New feed-water often costs a lot of money, especially in the neighborhood of cities. All new feed-water isn't fit to go into a boiler, because it may contain injurious substances like organic matter or scale-forming salts. Many steamships have to condense for boiler feed in order to escape being mere water-tank steamers.

3. Some engines absolutely have to have cylinder oil, and even that won't lubricate them satisfactorily at any number of drops per minute. Unless other engines get plenty of cylinder oil, they labor under excessive friction; but there are engines which are running on Dixon's Ticonderoga Flake Graphite with little or no oil, and are doing A No. 1 service.

The explanation of graphite lubrication for steam cylinders is simply that, when the surfaces of cylinders and pistons are perfected and polished, and maintained by a regular supply of graphite, the water of condensation, of which there is almost always an abundance, provides the film of liquid lubricant that keeps down the friction loads.

In this connection the following points are of interest and importance:

Flake graphite does not choke or clog exhaust pipes and may be readily removed by any good form of extractor or separator. Flake graphite will soon settle out of the feed-water in a hot well, and will not pass through a filter. Flake graphite need not be kept out of boilers and condensers, for it is an excellent conductor of heat and most efficient in preventing the formation of tenacious layers of scale. In fact, graphite is coming to be used more and more, not only for coating the interior of boilers to prevent corrosion, pitting and sticking of scale, but we have good authority for the statement that Dixon's Ticonderoga Flake Graphite No. 1, or coarser flake, is an efficient scale softener and remover.

An engineer recently recounted how every two weeks he introduced a half pound or so of this graphite into his boilers, and stated that it actually seemed to penetrate the layers of scale, causing them to become crumbly, so that they would drop off when the shell and tubes were lightly tapped with a hammer. He stated that he found that the graphite had actually worked its way into the scale.

Oil vs Grease

and

DIXON'S GRAPHITE GREASES.

In a recent publication, "Oil vs. Grease," we took up this much-mooted question of the relative merits of oil and grease as lubricants.

Briefly our position is this: There are bearings where oil only can be used with entire success, but wherever it may be employed, and if suitable grease may be obtained, the latter possesses greater advantages in reliability, cleanliness, economy and safety. If a suitable grease be found for each situation, its use proves in the highest degree satisfactory.

The most conspicuous feature of graphite as an ingredient of greases is this: The addition of small percentages of Dixon's Ticonderoga Flake Graphite to greases enhances their endurance as well as their efficiency in a wonderful degree, enabling a given grease to do much heavier duty than would otherwise be possible.

To present the same thought in a different phrase, if Dixon's Flake Graphite is used in greases, thinner, less viscous greases may be employed with entire safety and satisfaction. Flake Graphite smoothes the metal surfaces, working into every pore and irregularity, furnishing a firm, glossy surface that relieves the grease of a great portion of its task of keeping the rubbing parts from actually touching.

These and many other points of interest are brought out in our pamphlet, "Oil vs. Grease," and we shall be happy to mail a copy to anyone interested.

Among the more generally useful of Dixon's Graphite Greases are:

Dixon's Heavy Graphite Machine Grease.
Dixon's Waterproof Graphite Grease.
Dixon's Graphite Cup Greases.
Dixon's No. 8815 Graphite Grease.
Dixon's Graphitoleo.
Dixon's Graphite Axle Grease.
Dixon's Graphite Wood Grease.

GREASE AND OIL FOR LUBRICATING MACHINERY.

By W. H. Wakeman.

The title of this article might have been written "Grease versus Oil," but that would not have correctly indicated the nature of a few lines that I wish to present on this subject, for both grease and oil have their sphere in which they do good work; therefore neither can be used exclusively.

It is amusing to note the different ideas expressed along this line by those who have met with disappointment or satisfaction, as the case may be, in using both. But at the same time, useful lessons may be learned from all such expressions of opinions.

There is much valuable literature on this subject, including several books that treat of different phases of it in detail; but the working engineer, who has tried both and decided on one of them as best suited to his needs, cares little about which gave the best results in some scientific tests, the conditions of which do not apply to his case.

It will be both interesting and valuable, however, to point out some of the conditions which favor grease; also those under which the use of oil is more desirable.

The first shafting that I had charge of was fitted with hangers, the boxes of which contained long, narrow slots that did not extend down to the shafting, but a hole about three-eighths of an inch in diameter was bored or cast in the bottom of each slot, extending down to the shaft.

In practice these slots were filled with waste, and, once each week, I took out this waste, satisfied myself that the holes were clear, poured in some heavy, black oil, replaced the waste, saturated it with oil and had no trouble in running them for six days more. At that time I did not feel that anything better was necessary, as I was contented and happy; but, at the present time, such devices would be considered crude and unsatisfactory.

In my present plant there are bearings that were intended to hold grease, for the slots extend to the shaft, so that if imperfect lubrication causes heating, the grease immediately drops down and cools off the bearing. These bearings seldom need attention in less than six months from the time they are filled. It is quite possible to fill these slots with waste and then saturate them with heavy oil, but that would be a step backward.

Some of the bearings in this plant are fitted for using oil exclusively. Each one has a large reservoir below the shaft, and steel rings hang on the shaft and reach down into the oil. As the shaft revolves, motion is imparted to these rings and they carry the oil where it is needed for lubrication, proving satisfactory.

The bearings on my jack-shaft carry a good supply of oil in reservoirs, into which pieces of felt extend and are constantly saturated with oil. The upper part of this felt touches the bottom of shaft, and, as it revolves, the capillary attraction keeps the shaft well lubricated. Both of the foregoing need attention but once in six months.

There are places where neither of these devices would be satisfactory, and the writer has had his share of work in such places; dark, dusty holes—those words express the idea exactly—where daylight never comes and everything is covered thickly with dust, yet the experience gained in these places has proved invaluable in better situations.

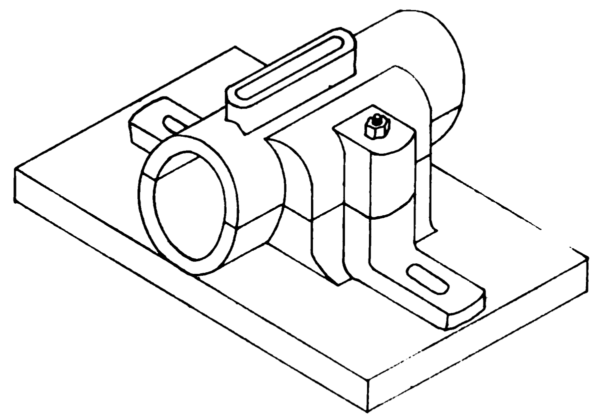


FIG. 1.

Fig. 1 illustrates a form of bearing much used in these places. It contains a large slot which extends down to the shaft, and when this is filled with a suitable kind of grease, there is little danger of a hot box under ordinary conditions. If a thin grease that melts readily is used on such a bearing it will be wasted, for when it starts to run down it continues to flow after it is not needed. Where a thicker grease is not available, a strip of wood, wide enough to close one-half or three-quarters of the slot, may be used. Dixon's Flake Graphite, mixed with this grease, not only makes it a trifle stiffer, but renders it much more durable and reliable.

A bearing similar to this is supplied with many engines as an outside pillow block, but some engineers do not care to use grease here. The common plan is to pack it with waste, then pour oil on it at stated times; but this is not the best plan. Fit a piece of cast iron into it, after boring and tapping two holes for sight-feed oilers, as illustrated in Fig. 2. This plan enables the engineer to regulate the feed

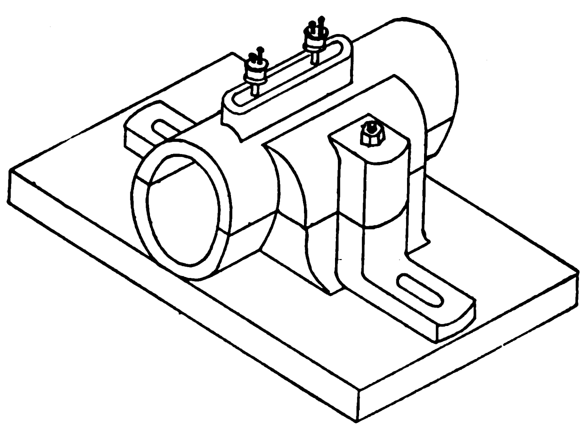


FIG. 2.

at pleasure, saving oil and practically eliminating all danger of a hot box.

It is possible to fit an engine with oilers and oil catchers that will prevent oil from being thrown across the room, but there are many engines that are not provided with these devices; consequently, if the engineer finds that he can use grease instead, he pronounces it much cleaner and neater.

On the other hand, if an engineer that has used oil without trouble decides to use grease, it is quite possible that he may declare oil to be cleaner, because he finds his crank-pin and wrist-pin boxes daubed with second-hand grease when he wipes his engine, and in such cases it seems as if a piece as big as a pea covers about one square foot of surface with black sediment.

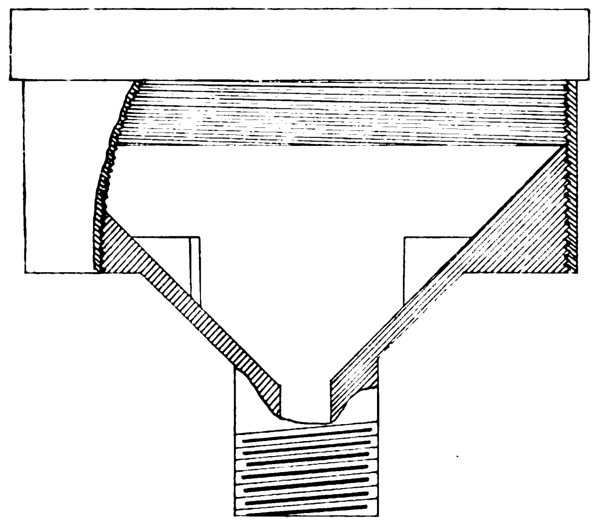


FIG. 3.

Fig. 3 illustrates a grease cup intended for use where it can receive attention at short intervals, as the cap must be screwed down to force the grease between the surfaces.

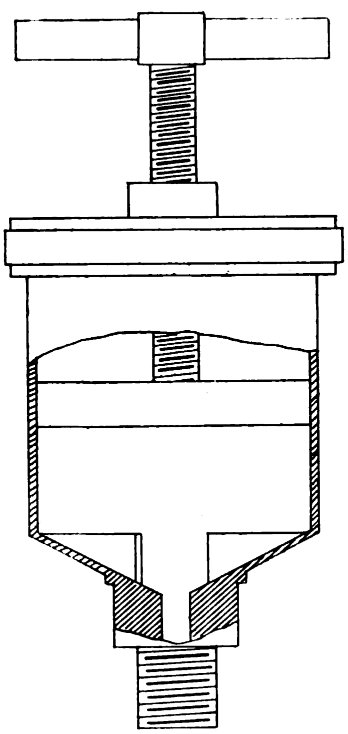


FIG 4.

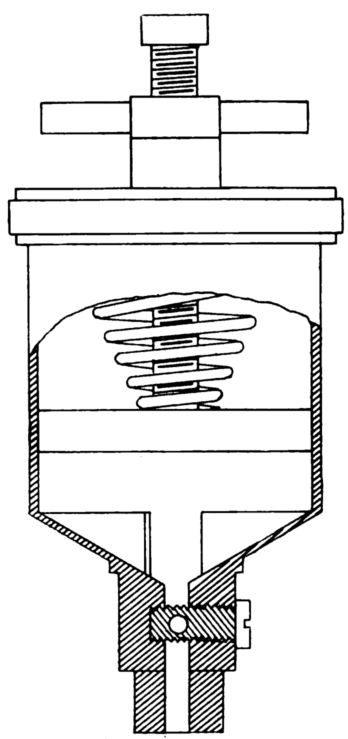


FIG. 5.

Fig. 4 has a greater range, as it holds more grease for a corresponding diameter, and is fitted with a plunger that may be forced downward by the screw shown until nearly all of the grease is expelled. As this screw is fitted with a cross-bar, its position denotes whether the screw remains stationary or not.

Fig. 5 has a plunger that is forced downward by a spring, the tension of which may be regulated by means of the screw and check-nut shown. There is also a screw in the shank which is used to regulate the amount of opening through which the grease must pass.

This cup is suitable for a place that is not readily accessible while the engine is in motion, for by experimenting with the feed the engineer can set it so that no further attention will be required for many hours.

Fig. 6 illustrates one of the engines in my plant. It revolves 300 times per minute and the valve gear is fitted with five grease cups similar to Fig. 3. There is no eccentric on it, but the rod receives motion from a pin that is set about an inch and a half from the centre of crank shaft when the wheel is at rest; consequently this pin travels through a circle three inches in diameter when first started or when carrying a heavy load calling for a late cut-off.

The grease cup is tapped directly into the end of pin and the grease is delivered to rubbing surfaces through a passage that extends to the surface of pin. The cap of this cup is adjusted by means of a left-hand thread; consequently, when the engine is in motion, running over, by taking hold of this cap and preventing it from turning, it is screwed on further and some of the grease is forced out through the proper passage until it reaches the rubbing surfaces, which it separates for a time, thus preventing friction.

It requires some dexterity to grasp this rapidly revolving grease cup, but this is soon acquired. Although the valve of this engine is nicely balanced, there is much friction on this pin, owing to the nature of its motion and the work it has to do; but it offers an excellent opportunity to use graphite, as it can be mixed with the grease and is readily forced where it is wanted. The fact that graphite is black does not weigh against it here, because there is practically no difference between the appearance of grease that contains it, and that which is free from it after both have passed through this bearing.

The only objection to this plan is, that the cup cannot be refilled while the engine is in motion. As it is never wanted for more than five hours without shutting down, this is not a serious objection; but it would be, where a long-continued run is required. When a new man tries it, he is sure to run the grease out much faster than is necesary, but this error is easily corrected. If provision had been made for using oil on this bearing, it would be possible to run the engine for weeks without stopping, as the other cups can be filled while in motion, although it is not a slow job.

There is one point gained by using grease that cannot be secured with oil. The first engine that I had charge of was not new, and, although the speed was only 72 revolutions per minute, its eccentric straps rattled every time that their motion was reversed. This was due to the fact that the eccentric was worn flat, or, in other words, its diameter was not equal at all points. If the straps were adjusted to prevent rattling, they would heat, because they would bind at certain parts of each revolution. This defect, which is very common, made it necessary to disconnect the eccentric rod from the rocker every time that an

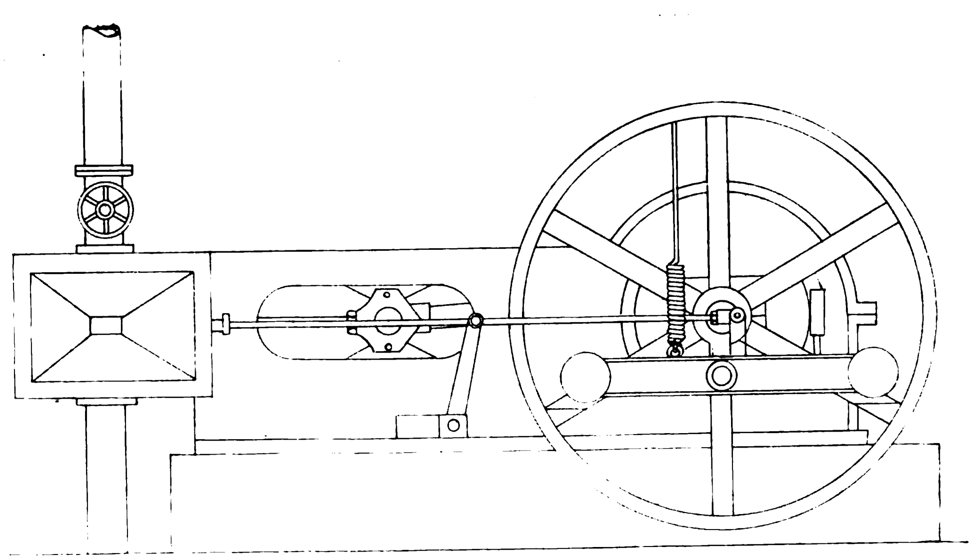


FIG. 6.

adjustment was made, and turn the straps on the eccentric through at least one-half revolution, in order to be sure that they did not bind at any point. This is a good plan to adopt wherever it is practical.

When they commenced to rattle, while in service, if heavy grease was forced down between the surfaces, it would prevent noise at this point, but even heavy oil would not answer the same purpose.

The same effect can be secured on the engine shown in Fig. 6; for, although it is possible to adjust the parts so as to prevent all lost motion, it is not practical to maintain this adjustment at all times, especially as some of it is due to boxes that do not fill all space between the shoulder and the head of pins to which they were originally fitted; therefore the use of grease prevents some of those light knocks which conspire to annoy an engineer. A box should always be adjusted before the grease cup is filled and the cap screwed down, because no grease should be between the surfaces at this time.

I'm glad I'm an American!
Do you know the reason why?
'Tis the best and greatest country
Under the deep blue sky.

The people here can rule themselves
Whene'er they choose to try;
And have liberty and progress—
Now you know the reason why

I'm glad I'm an American,
And hope to live and die
In the best and greatest country
Under the deep blue sky.

—JAMES POOTON.

Here is a scientific opinion of Dixon's Lubricating Graphite which is worthy of more than passing notice as coming from a thoroughly reliable source:

UNIVERSITY OF NEVADA.
SCHOOL OF MECHANICAL ENGINEERING.

G. F. Blessing, M. E., Professor of Mechanical Engineering.
J. G. Scrugham, B. M. E., Asst. Prof. of Mechanical Engineering.
W. B. Thompson, B. S., Instructor in Mechanical Engineering.

RENO, Nev., Oct. 12, '04.

Joseph Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN :— Replying to yours of the 4th inst. I find that application of your graphite No. 635 to a chronically hot crank pin on high speed engine, causes it to run as cool as could be desired. As nearly as I can estimate it cuts down the consumption of oil about half.

Yours very truly,
(Signed) JAS. G. SCRUGHAM.

Among other things, the ideal lubricant should be able to endure tremendous crushing pressure, and should wholly prevent the possibility of cutting or seizing. Dixon's Flake Graphite alone fulfills this condition.

LUBRICATING PIPE THREADS.

The old-fashioned idea of making a pipe joint was to smear the thread with red or white lead, which plugged up and cemented all the cracks and crannies blameable to imperfect shop work.

No one can deny that red and white lead makes pretty tight connections. It surely does, and so tight are these joints after the paint has had a chance to "set," that generally the fittings have to be smashed if changes in the piping become necessary. Sometimes ambitious steam and gas fitters will attempt to unscrew a red-lead joint, and the usual result is broken tools, wrenched piping, strained muscles, and profanity.

Another way of making pipe joints is "metal to metal," prominent in architect's and engineer's specifications, but not popular among practical men. The reasons for this are plain: If a joint is screwed up with simply a little lubricating oil on the threads, and stands pressure without leaking, it's a sure sign that the threads are accurately cut. That's why this method is dear to the heart of the architect and engineer — it requires the best possible workmanship. But there is nothing to prevent rust from working in between the threads of such a joint, and that is what always happens, and practical men know that a "rust-joint" is just as impossible to unmake without damage as a red or white lead one.

Incidentally, this method often results in screwing up joints so tightly at first to prevent leakage, that the fittings are strained to the breaking point.

The modern method — if we can conscientiously apply the word modern to a material over twenty-five years on the market — is to *lubricate* pipe threads with Dixon's Ticonderoga Flake Graphite.

Some engineers and pipe fitters use simply flake graphite and oil, and though this is excellent, Dixon's Graphite Pipe Joint Compound is better — a true lubricant for the threads of pipe bolts, nuts, etc., making it easy to screw things up tight and protecting the threads indefinitely long from rust or corrosion. Enough of the graphite always remains on the threads to lubricate them, so that — be the time five, ten or twenty-five years after — a reasonable grip with a wrench will open a joint.

We have used this material for close upon three decades in our own great factories and mills, and no matter how long a steam pipe has been up, there's never any trouble getting a joint open, and the threads are as clean and bright as the day they came from the die.

DIXON'S GRAPHITE PIPE JOINT COMPOUND

is a very useful substance, not alone for pipe work but for bolts, nuts, cylinder-head studs, boiler hand and man-hole plates, gaskets, flanges and faced connections.

"TICONDEROGA."

Remember that of all the world's graphite, Dixon's Ticonderoga Flake is without an equal.

GRAPHITE FOR GAS ENGINES.

The Prouty-Pierce Locomotive Manufacturing Company, of Kansas City, Kan., send out a can of Dixon's Flake Graphite No. 2 size with each of their machines. We wrote asking details of how they use graphite and how they advise their customers to use it. The following letter is not only interesting but decidedly instructive, and many of our readers may do well to follow the ingenious plan of the Prouty-Pierce Company, which they so generously give to the public:

PROUTY-PIERCE LOCOMOTIVE MFG. CO.
Light Gasoline Locomotives for Contractors, Logging and Industrial Work.

KANSAS CITY, Kan., Sept. 22, '04.

Joseph Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN:—We have your favor of the 19th referring to the use of graphite in our gasoline engines.

We use your graphite to season up our engines and our journals in the engines, and not only recommend but insist on its use perpetually.

We have made it a practice for some time to make the last cut on the piston with a diamond-pointed tool with slow feed enough to give it very fine lines on the surface, or what might be called slight corrugation. We frequently give the cylinder the same treatment in the last cut, but cannot always do this so conveniently on account of using large tools with large feed; but we never fail to do it on the piston. The object of this treatment of the piston is to load this slightly broken surface with graphite, and the result is that it faces up evenly and we have the two materials — the cast iron and the graphite — coming in contact with the surface of the cylinder. You will note that when the graphite is once crushed into this uneven surface and evens it up, it remains there perpetually; but, of course, graphite should be used all the time to keep the body intact.

As a result of this treatment, our engines will run for years without having to be re-bored. Nearly all gasoline engine builders have fallen in the erroneous habit of polishing the piston, so that the graphite cannot lodge and retain as strong a hold on the iron to make permanent surface. In addition to this slightly corrugated surface, we cut a groove in the form of rings around the piston, which is always loaded with graphite and oil to re-inforce the lubrication of the entire working surface.

We have tried mica but prefer Dixon's Lubricating Graphite, and not only recommend it, but make it a point in our guarantee covering the durability of the machine.

We always use this graphite very freely in the oil, lubricating the friction faces of our clutch, which prevents cutting and heating and gives us the same wear of life as the ordinary journal. This may sound a little strange to the inexperienced, but it is no secret, as anybody can see the graphite and oil fed into the frictions.

These facts are a matter of common observation to all who see our machines in operation, and you will appreciate the fact that our engines and locomotives are along the highest mechanical lines known, and so far have no equal in any country.

Yours very truly,
(Signed), E. PROUTY.

Graphite

VOL. VII. FEBRUARY, 1905. No. 2.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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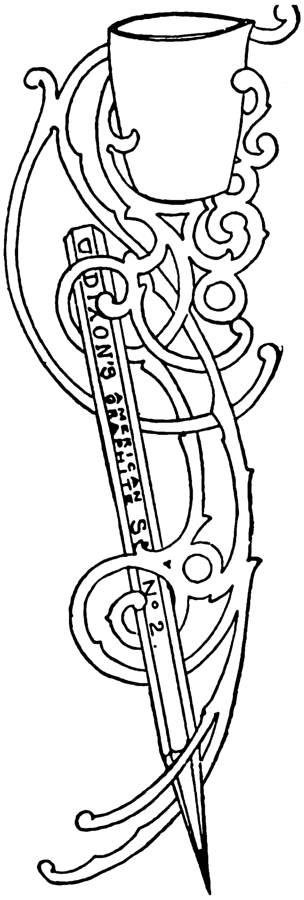


THE WORK SPRINGS PERFORM.

Motorists sometimes wonder why automobile springs break or give trouble in other ways. If one will but watch a car with front seat and tonneau well filled bowling along at a twenty-mile an hour or so gait, however, the wonder will be lessened. The rapidity with which these springs have to yield to the pressure put upon them, and spring up and down, is something marvelous. One sometimes wonders which is the worse—the shock or the recoil; each is great and a most severe test of the quality of the springs. By comparison, the springs on a horse-drawn carriage have little work to do. The pace is so much slower and the load carried so much lighter.—*Motor World.*

It is not to be wondered, then, that springs wear out and break. The wonder is that many leaf springs last as long as they do, and do not break, for often rust gets in between the leaves and hastens the natural wear of these unlubricated surfaces. We say "unlubricated," because even now the majority of spring makers do not take pains to lubricate leaf springs. The best makers do, however, and the lubricant employed is Dixon's Ticonderoga Flake Graphite.

Perhaps as effective, and at once as simple, a method of permanently lubricating springs, is to paint the surfaces of the leaves, before assembling them, with thin shellac, and while this is still sticky, apply a thorough coating of Dixon's Flake Graphite No. 1, or standard size, which the shellac will hold in place. This will assure a perfectly smooth action of the leaves one over another, and an easier riding vehicle, and the layer of graphite will remain intact for an indefinitely long period.

To apply graphite in this manner after the springs have been put into service, would mean a good deal of trouble, but we are confident that when a motor car or carriage is being generally overhauled, the little extra time put on the springs will prove a profitable investment.

WATCH THE LUBRICATION.

Take nothing for granted when it comes to the condition of an automobile, least of all assume that the lubrication is all correct solely because the oil-bereft parts may not have raised their voices to high heaven for your information. It is the silent dog that bites, and too often it is the uncomplaining bearing that without warning lands you in the ditch. Look carefully, then, to your lubrication, and make the work of doing so as easy as possible by having every convenience at hand. The plugs and cocks intended for the drawing off of the used oil from the crank cases should be carefully looked after so they cannot work loose while running. If an undue amount of oil drips from any particular point of the vehicle it may indicate either that the supply is excessive, that means for retaining it are not proper, or that the oil is too thin. Thick oil, on the whole, gives little trouble from working out of bearings, especially when everything is worn. The cleaning of the engine and the parts appertaining thereto is a duty which no one having the instincts of a mechanic will shirk, as the dust which an excess of oil on the outside surfaces of the wearing parts is constantly collecting, may prove very injurious to the mechanism if neglected, as too often it is.

—*Automobile Magazine.*

Every operator of any machine is interested in lubrication, whether he enjoys the thought or not, for without lubrication no machinery can run at all. The better the lubrication, the better and smoother does the machine run. Those who are interested in better lubrication for the automobile will do well to send for "Graphite for the Motor," the Dixon lubrication booklet for autoists.

DIXON'S NO. 635 GRAPHITE FOR GAS AND GASOLINE ENGINES.

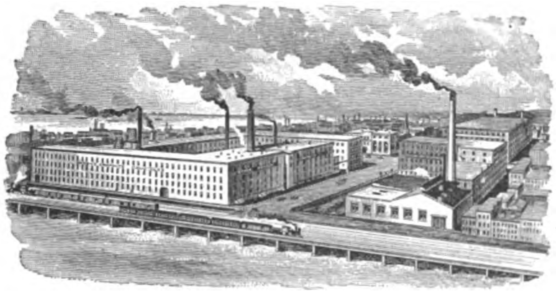
Mr. J. M. Williams, agent for gas and gasoline engines, Washington, D. C., writes to our representative at Washington as follows: "I used Dixon's No. 635 Graphite on a new motor I installed this spring. I gave the cylinder walls a coating of the No. 635 Graphite and the cylinder oil mixed, and as the oiling on the motor is done by the splash system, I simply put some No. 635 Graphite in the crank case with the oil whence it was fed to the working parts. I consider Dixon's No. 635 Graphite a help to any motor."

Brentwood, Ark., Oct. 8, 1903.

I am in receipt of your new copying pencil, the 'Eterno,' and after trial find it as good as any I ever used, and quite a little better than a great many. It should take its place among the best. Many thanks for the sample.

Jno. W. May.

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

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304 Market St., San Francisco. **Paddock Bldg., Boston.**
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GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

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DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George J. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., February, 1905.

GRAPHITE AND BLOOD POISONING.

Some few weeks ago there happened to a well-known member of the stationery trade a very melancholy accident, and one that is calculated also to raise suspicions in many minds as to the purity of the graphite contained in some, at least, of what are usually called "lead pencils." The facts, so far as they are generally known, are these: The gentleman in question cut his left thumb unfortunately while sharpening a black lead pencil with a penknife. Blood poisoning rapidly supervened, and, shortly after the accident, it was found necessary to amputate the left arm. A question that has naturally been the subject of a good deal of discussion is whether the blood poisoning was probably caused by something in the pencil or by something in the knife; and with the view of elucidating this question we have made inquiries both of some of the largest pencil manufacturers, and of one of the most eminent bacteriologists.

Lead pencil is, of course, a misnomer for graphite pencil, which arose, no doubt, from the fact that before the employment of graphite in the manufacture of pencils common lead was sometimes used. Now, however, and for nearly a century past, pencils are made of graphite, which is almost pure carbon, and the manufacturers we have consulted are unanimous in saying that there is nothing in either the wood or graphite of the pencils that have been made during the last half century, at all events, that could in any way give rise to blood poisoning. Further than this, they declare that in all their experience, out of the innumerable cuts and wounds that have happened in connection with the manufacture and treatment of pencils, they have never known one that resulted in blood poisoning.

This is, so far, satisfactory; and we are glad to say that it is confirmed by the opinion of the bacteriologist we have referred to, who, in reply to a private letter on the subject, says:—

"Probably the cause was in the knife used. He had been using it beforehand, very likely, to pare his nails, and had got upon it some micro-organisms, *e. g.*), streptococcus or staphylococcus. These, introduced into the system, would set up blood poisoning. I do not think the infection was due to the lead pencil at all, but think it far more likely that the infection was due to the knife used. Obviously no *decided* opinion can be passed by those who only hear of the case, and who do not themselves investigate it."

Streptococci and staphylococci, we may perhaps mention, are subdivisions of micrococci (from two Greek words meaning "small" and "seed"), the former growing in chains consisting of a number of individuals strung together like beads upon a string, the latter growing in masses like clusters of grapes, as is signified by the etymology of the words. Of the spores of these micro organisms, Dr. Frankland says that they "are the hardiest forms of living matter which science has yet revealed. (A. E. Abbott, "Principles of Bacteriology, 0756, p. 5).—*The Stationer, Printer and Fancy Trades' Register.*

HERE'S ECONOMY!

We have a letter from the chief engineer of a large light, heat and power company in one of our western cities, from which we quote the following interesting paragraphs: "In regard to the use of graphite in cylinder lubrication I beg to inform you that we are now using your No. 1 flake graphite on a Corliss engine which is provided with a force feed automatic oil pump. Formerly the engine required three-quarters of a quart of oil every twelve hours, now the same quantity of oil lasts *sixty-six* hours with a small teaspoonful of flake graphite added every twelve hours.

"We always used your graphite on bearings for the last five years, but not until recently as a cylinder lubricant. We thought that perhaps you could tell us of a reliable device for feeding flake graphite without any oil. We have tried it with water, but our pump clogs up in two or three hours on a mixture of graphite and water, although it feeds graphite and oil perfectly."

We haven't solved this problem of a dry graphite lubricator to our own satisfaction as yet, but we're "getting warm," and some of these days will be able to give engineers a device that will do this service and do it just right.

GRAPHITIC ACID OR OXIDE.

By Frederic S. Hyde.

The preparation of the yellow insoluble substance termed "graphitic acid," which has been described by Brodie, Berthelot, Staudenmaier and others, and to which the formula $C_{11}H_4O_5$ has been given (Mendenleeff's Principles of Chemistry), is, perhaps, one of the best illustrations of the derivation of an organic compound directly from elementary carbon—a link, as it were, between the organic and inorganic worlds. It is not only a characteristic derivative of graphite in distinction from other forms of carbon, but it is also noted for its peculiar instability, or power of deflagrating when subjected to a temperature just below a red heat, leaving a black, buoyant, sooty residue known as "pyrographitic acid," $C_{22}H_2O_4$ (Tidy's Handbook of Modern Chemistry).

Notwithstanding the somewhat indiscriminate use of the terms "acid" and "oxide," the expression "graphitic oxide" is usually applied to the grass-green substance obtained as an intermediate product during the transformation of the graphite to the yellow acid. This "green oxide" likewise possesses the power to deflagrate when dry. It also represents a critical step in the transformation, its color being indicative of the presence of graphite.

Staudenmaier's method of preparation evidently depends on the use of "puffed up" or expanded graphite (aufgeblähten Graphit); otherwise the operation might be prolonged for days, or even weeks. According to Staudenmaier, graphitic acid may be prepared in quantity in a short time, 24–48 hours (Chem. Centr., 1896, **69**, 258, and Ber., **31**, 1481–1487), without danger of explosion from chlorine dioxide by mixing in a shallow porcelain dish at the ordinary temperature, 1 litre of crude concentrated sulphuric acid and ½ litre nitric acid (sp. gr. 1:4), and stirring into this mixture 25 grams "puffed up" or expanded graphite, followed at intervals by portions of dry potassium chlorate—450 grams in all. After testing with permanganate and acid to obtain a bright yellow color, the whole is poured into an excess of water, allowed to settle and decanted. The green residue is thoroughly washed and heated with a solution of 7 grams potassium permanganate in 120 c. c. water, to which, after cooling, 90 c. c. of dilute sulphuric acid (1:5) is added. The product, no longer green, is transferred to a porcelain dish and heated on the water-bath until the red coloration disappears, and then treated with hydrogen peroxide, stirring the mass occasionally and allowing to stand a while. The graphitic acid is washed with dilute nitric acid (1·28 sp. gr.), then with alcohol and ether and dried. For small quantities it is suggested that 30 grams of potassium chlorate be stirred into a mixture of 40 c. c. sulphuric acid and 20 c. c. nitric acid at a temperature of 20° C., and when nearly dissolved 1 gram of graphite added and thoroughly stirred. It is stated that in five minutes it becomes bluish and greenish, and in about an hour it is sufficiently transformed to become yellow immediately with permanganate.

On trying this method the writer found that direct treatment of Ceylon graphite (200 mesh fine and 90 per cent. pure) failed to give satisfactory results, until the graphite itself had been subjected to a preliminary treatment to obtain the "puffed-up" or Brodie's form; and even then it required 10–12 hours to become dark greenish, and, after renewing the chlorate mixture, two days before it was sufficiently transformed to yield the yellow product with permanganate and acid.

It is recommended not to oxidize more than 20–25 grams graphite in the same dish, at the same time, at a temperature above 20° C., especially in summer—simply a precaution against local overheating and collection of explosive gases in bulky solutions.

For rapid oxidation, Staudenmaier suggests a preliminary treatment of the graphite, using 300 c. c. crude concentrated sulphuric acid, 100 c. c. concentrated nitric acid (1·4 sp. gr.), 50 grams pulverized Ceylon graphite, stirring in at intervals 100 grams potassium chlorate and allowing to stand several hours at the ordinary temperature. After thorough washing with water, the graphite so treated is heated to a glow in a large metal dish, so that it expands or "puffs up." When cool the "puffed-up" mass is stirred in water and the floating portions taken for further oxidation. The writer found this treatment quite satisfactory and far preferable to Brodie's dangerous method, in which sulphuric acid and chlorate alone are employed.

The general method adopted by Staudenmaier for preparing graphitic acid deserves consideration because of the substitution of potassium permanganate, sulphuric acid and hydrogen peroxide to complete the oxidation. His method is, however, somewhat tedious and uncertain, and is also characterized by the excessive amounts of potassium chlorate required to produce the green oxide—nearly a pound of chlorate to every ounce of graphite oxidized. The fumes evolved on stirring the acid mixture are copious and very disagreeable, and even in small quantities seem to exert a depressing effect in spite of precautions for ventilation.

Staudenmaier's objection to Moissan's method consists mainly in the difficulty of preparing anhydrous nitric acid (monohydrate) in sufficient quantity to yield large amounts of graphitic acid. But it is quite evident that anhydrous nitric acid, once obtained, fully repays the pains taken in its preparation, even if necessary to conduct several separate distillations at once to obtain the requisite quantity.

Brodie, who is credited with being the first to discover that graphite could be oxidized to graphitic acid, and Berthelot, who investigated methods for distinguishing various forms of carbon, evidently depended on the use of strong nitric acid and chlorate of potash at low temperatures. Berthelot states that with a mixture of potassium chlorate and red fuming nitric acid, graphite is oxidized to graphitic acid (Chem. Centr., 1896, **67**, 466). This may be true with certain amorphous graphites, but, as a rule, the ordinary fuming nitric acid, as obtained from the dealer, is not concentrated enough for the reaction.

Probably one of the most simple and satisfactory methods, a combination of Berthelot's and Staudenmaier's, is that described by Fitzgerald (this J., 1901, 443–445).

Instead of heating over the ordinary water bath, as in Fitzgerald's case, the writer prefers a beaker containing water at 60° C., in which the test tube is inclined, the temperature being maintained by placing the beaker on top of a radiator or hot air bath. Above 70° C., explosions vary-

ing in intensity from the "toot" of a small whistle to the noise of a fire cracker are liable to occur, rendering close observation hazardous. Excessive amounts of potassium chlorate are unnecessary. The acid used should be especially prepared by distilling a mixture of equal parts C. P. concentrated sulphuric and nitric acids, so as to obtain one-third in bulk of distillate.

After obtaining the grass-green oxide, it should be washed with water and heated on the water bath with about 150 c. c. N/50 permanganate solution to which dilute sulphuric acid has been added. The substance should assume a yellow color, and the permanganate show signs of reduction. Hydrogen peroxide is then added to destroy the permanganate and "clear up" the solution. The yellow crystalline product may be washed by decantation successively by dilute nitric acid, alcohol and ether; but generally two or three washings with absolute alcohol on a filter will suffice, after which it should be dried at the ordinary temperature.

Ceylon graphite of 90 per cent. or more purity seems to produce the best results. The green oxide is formed more readily from Ceylon graphite than from artificial graphite; and not at all from ordinary coke, or charcoal, carbon black. As a rule, ordinary carbon or carbonaceous matter simply passes into solution, imparting a dark brown color to the oxidizing mixture, such solubility forming a basis of separation from graphite. Charcoal dust may be almost completely dissolved in twenty-four hours, yielding the usual coffee-colored solution and a whitish residue which dissolves on dilution, imparting a yellowish-brown coloration. This is not necessarily true, however, with gas retort carbon, which is more or less inert and may give an unmistakable green solution, as if it were partially graphitized and required only a strong electric current to complete the graphitization.

Some of the low grade amorphous graphites respond readily to the test, while others, like Bohemian and Mexican, are uncertain. With the American flake variety the action is slower than with Ceylon, yielding a darker shade of "green oxide." Occasionally the writer has obtained the final product as a dark-brown powder, which deflagrated more readily than the yellow form. Very often the yellow acid seems to retain the flaky structure of the original graphite.

That graphitic "oxide" may be produced more readily from natural than from artificial graphite is no criterion of the refractory powers of the latter, since, gram for gram, the best Ceylon lump, after proper milling, resists oxidation by fire much longer than artificial graphite of the same carbon content and degree of fineness and under same conditions. Apparently the more perfect the graphitization the more readily is the graphitic oxide formed, although a hard crystalline structure in itself might retard the reaction.

Whether or not natural graphite is the result of the decomposition of plant life; or the destructive distillation of hydrocarbon gases; or the metamorphosis of charred residues from prehistoric forest fires, it is, nevertheless, quite evident that differences in physical structure are usually accompanied by differences in behavior with oxidizing agents. Ceylon plumbago, occurring in massive form and yielding an ash more or less granular, should not be classed with the American flake varieties having a micaceous structure, nor with the amorphous compact forms containing argillaceous matter.

The use of the chlorate oxidising mixture to distinguish graphite from other forms of carbon through production of insoluble graphitic acid and soluble humic acids has claimed more or less attention from time to time (Berthelot, Comptes rend. 1869, **68**). The Staudenmaier mixture has already been recommended by Fitzgerald for testing carbon electrodes to determine whether they are composed entirely of amorphous carbon or partially of graphite (Electrochemical Industry, Oct. 1902, page 68). Of course, graphite itself may exist in the amorphous state and produce the usual grass-green oxide.

While approximate separations may be made with simple mixtures of graphite and charcoal dust or ordinary coke, the results are hardly satisfactory with hard gas retort carbon for reasons previously stated.—*Reprinted from the Journal of the Society of Chemical Industry, 31 March, 1904. No. 6, Vol. XXIII.*

REDUCTION OF LOAD ON STEAM ENGINES.

Effect On Indicator Diagrams.

By W. H. Wakeman.

Chapter I.

Every steam engineer knows that when the load on his engine is reduced, less steam goes to the cylinder; therefore less coal is burned in the furnace under ordinary conditions; but all engineers do not agree when stating the details of results secured.

While this difference does not add to nor detract from the good effects, it shows that the matter is not fully understood by those of limited experience along this line, who do not profit by the experience of others. This does not necessarily mean young engineers alone, for there are many engineers who have had charge of plants of various capacities for a long time, yet their experience along some lines in steam engineering is very limited. One reason for this state of affairs is that the field of engineering is very broad, consisting of many elements in great variety. Therefore it is very seldom that the experience of one engineer covers the whole. Another reason is that men do not always profit by the opportunities offered for gaining information.

Reduction of load on an engine always means less opposition to the advance of its piston as it travels to and fro; but there are several ways in which this desirable result can be accomplished.

Some of the machines may be stopped or put in better order, so that the work is done with less power. The shafting may be lubricated better, thus reducing friction; or, where a poor grade of cylinder oil has been used, causing both valves and piston to move hard, graphite may be added, the effect of which is to cause these rubbing surfaces to slide more easily. Sometimes a change in the kind of cylinder oil used gives beneficial results, although a standard brand is used in both cases.

In these chapters reduction of load by stopping or improving machines will not be considered, as we wish to direct attention to what can be done by improving the lubri-

cation of shafting in a mill or shop; also by providing better lubrication for the valves and piston of engine and its bearings that are not hidden by steam. Furthermore, we wish to show in detail the effects of this reduction on diagrams taken from two kinds of engines and explain the operation in full.

The diagrams herein illustrated were not taken from engines in actual service, but are ideal specimens introduced for the purpose of making the matter plain to every reader. They correctly represent the points in connection with which they are used.

Where the friction of shafting and engine is excessive, which is a very common fault in our manufacturing establishments, the use of graphite is sure to prove beneficial, which leads some engineers to claim that when it is properly applied their engines develop more power than before. As this statement is not logical, it is hoped that these chapters will clearly show the fault mentioned and correct the mistake.

When presenting explanations and illustrations, especially if comparisons are to be made, it is necessary to clearly state existing conditions in order to avoid misunderstandings.

Both automatic and throttling engines will be treated, and it is assumed that the load carried, so far as the running of wood and iron working machinery, electric generators, cotton and flour mills, air compressors, pumps or any other kind of machinery, is concerned, is absolutely uniform throughout the entire period under consideration, as otherwise the change in diagrams could not be definitely accounted for, as it might be credited to improved lubrication, when, in reality, it was caused by stopping a machine. It is often difficult to obtain a perfectly even load during a test; but, when it is secured, the effects of reduced friction will be duly and plainly recorded by diagrams taken at different times; hence a comparison of them will lead to a better understanding of the whole matter.

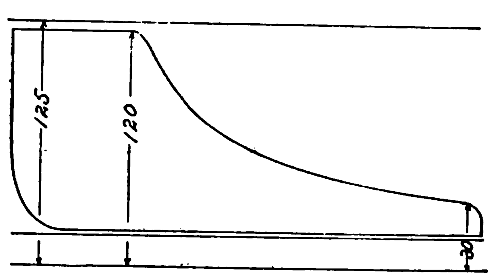


FIG. I.

Fig. 1 illustrates a diagram from an automatic engine of the Corliss type, taken when a cheap and inferior oil was used to lubricate all bearings in the shop, while a poor grade of cylinder oil, without graphite, was put into the steam chest and cylinder.

The valves and valve-gear of this engine are operated by a single eccentric; hence the limit of automatic cut-off is at about three-eighths stroke; but, with the load indicated by this diagram, it takes place at one-quarter stroke.

The boiler pressure, at this time, was 110 pounds by the gage, or 125 pounds absolute. The difference is due to the weight of the atmosphere, which is determined by the barometer, for it not only varies with the height above sea level, but it is not always the same in one place. For greater accuracy and convenience the barometer is graduated into inches and fractions of the same; it is reduced to pounds by dividing by 2.04. If it indicates 29.9 inches, then 29.9 divided by 2.04 equals 14.651 pounds. Or it may be reduced to pounds by multiplying by .49, as $29.9 \times 49 = 14.651$ pounds. If the location is near sea level, it is customary to assume the weight of atmosphere to be 14.7 pounds where close calculations are desired, or 15 pounds for ordinary use, which answers every purpose in this case.

The straight line above the diagram represents boiler pressure. It is located by measuring upward from the vacuum line with a scale corresponding to the spring used when the diagram was taken.

The first line below the diagram indicates atmospheric pressure. It is located by shutting off steam after the diagram is secured and holding the indicator pencil the same as when taking a diagram. This corresponds to zero by the gage, because atmospheric pressure is balanced at all points to which air has free access, and the gage indicates only unbalanced pressure from this source.

The second line represents a perfect vacuum or the absolute zero of pressure. It is located by measuring downward, from the atmospheric line above described, with a scale corresponding to the spring used when the diagram was taken. From this it will be plain that the atmospheric line must always be secured when indicating an engine, in order to have a correct base from which to take measurements.

The higher horizontal line of the diagram is called the steam line, because its position indicates whether the initial pressure, or pressure at the beginning of stroke, is maintained to the point of cut-off or not. It is always below the boiler pressure line, because there must be a difference of pressure between two points, in order to cause steam to flow from one to the other. Therefore initial pressure in this case is assumed to be 5 pounds less than boiler pressure, making it 105 pounds by the gage.

The lower horizontal line of diagram is above the atmospheric line, which shows that in forcing steam out through the exhaust pipe, heater, etc., back pressure is created.

The line of perfect vacuum is drawn because all measurements relating to the expansion of steam must be taken from it. In order to make the matter as simple as possible, the effect of clearance is not brought into the calculation.

The ratio of expansion is found by dividing 1 by the fraction of stroke completed when cut-off takes place. In this case it is one-quarter or .25; therefore the ratio of expansion is $1 \div .25 = 4$. Pressure at the end of stroke or terminal pressure is found by dividing pressure at point of cut-off by the ratio of expansion. Here it is: $120 \div 4 = 30$ pounds.

When Fig. 1 was taken, the valves of engine worked hard, causing the valve-rod to tremble on account of the great strain brought to bear upon it. The valves groan and the piston grunts, because steam forces them to go while the sliding surfaces are not perfectly lubricated.

The addition of Dixon's Flake Graphite to the cylinder oil will reduce the vibration and stop the unpleasant noises mentioned, in some cases, but it is quite possible that the

oil is totally unfit for use in that place, and perhaps it is not good enough for any engine; therefore it should be replaced by a better kind; but the graphite may be a valuable addition to the best oil that can be found.

This reduces the load at once, and the use of a superior oil on the shafting, loose pulleys, etc., will reduce it still further. Therefore, when another diagram is taken with the same machinery in operation as before, it is represented by Fig. 2. Cut-off now takes place at one-fifth or .20 of the stroke;

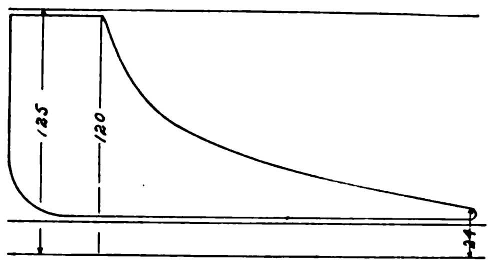


FIG. 2

therefore the ratio of expansion is $1 \div .20 = 5$, and the terminal pressure is $120 \div 5 = 24$ pounds, or six less than before.

Some engineers are so enthusiastic in the praise of Dixon's Graphite, better oil or anything else that reduces friction, making their machinery operate more smoothly, that they claim that more power is developed. This is an error that needs correction, as before mentioned, for the effect of all such improvements is to reduce the power developed, and these two diagrams show this plainly.

It must be remembered, in this connection, that as the area of piston and speed of engine remain constant, any change in the area of diagram represents a change in the load. It follows that a change in the terminal pressure also represents a change in the load. Both of these important factors are less in Fig. 2 than in Fig. 1, then how can a statement that the use of graphite and better oil makes a stationary automatic engine develop more power, be true? If more power is developed, then more coal must be burned, which is an undesirable result; but we find in practice that less coal is called for, and this is consistent with the claim that less power is developed when friction is decreased, which certainly is correct.

(CONCLUDED NEXT MONTH).

"A SERIOUS APHAIR."

The Erie (Pa.) *Despatch* tells a good story of the attempt of a newspaper correspondent to "get there" with an out-of-gear typewriter. The editor having "kicked" on the copy, the correspondent sent the following apology:

"Mistaques are liable to happen in the best ov phamilies, and to typewriters as well. It is, indeed, a very unphortunate aphair, but the 'eph' and 'cay' phell out and are lost. This morning I called at the orphice ov the gentleman phrom whom I rent this outphit, but phailed to phind him in; in phact, the 'orphice cid' says he will not return phor phour or phive days. I do not lique the loox ov this variety of spelling, myselph, but will get the specials aphter a phasion. I, myselph, consider this no joque, but a serious aphair."

REPAIRS OR LUBRICATION?

A Short Talk To the Men Behind the Balance Sheet.

A well-known railroad paper recently called attention to this fact: "The locomotive is the only thing on a railroad that actually earns money. If 10 % of the locomotives are out of service for any reason, that proportion of the earning power is unavailable. If 20 % are in the shops or waiting to get in, the whole system begins to limp."

Poor lubrication will put a locomotive into the shop every time, to re-face a cut valve, to re-bore a scored cylinder and to reduce rod brasses or re-turn a cut pin. These repairs cost a road money and don't add any to the engineer's good record.

That's why locomotive engineers took to using Dixon's Flake Graphite. It cures many friction troubles. It prevents many friction troubles. It saves engines that would otherwise surely have to be shopped. It saves hundreds of dollars for railroad companies on repairs, tons of coal, gallons of oil and a great deal of trouble and worry for the engineer.

The engineer is interested in graphite lubrication because better lubrication is a vital point in his work. Can the manager afford to close his eyes to these important truths, when so much depends upon them?

BETTER COMPRESSION WITH LESS FRICTION.

Graphite lubrication for gas, gasoline and other engines of the internal combustion type, possesses marked advantages in its entire resistance to the great heat encountered in the cylinders—heat which no oil can endure. The benefits of flake graphite are shown in other ways, and, not among the least, is the immediate improvement in compression.

Good compression is of the highest importance in order to secure the greatest efficiency for internal combustion engines. The higher the compression, the higher the initial pressure will be at the start of the expansion stroke, and the greater the mean effective pressure upon which the indicated horse power depends.

Valves must fit tightly, and the mixture must not leak by the piston if good compression is to be attained. As engines are turned out from the factory, there must be an appreciable clearance between piston and cylinder which the snap-rings of the former help to close to a tight fit. Evidently the greater the pressure exerted by the snap-rings, the greater the friction of the piston, so that the economical limit of tightness by this method is soon reached.

If flake graphite is supplied to the cylinder, it rapidly coats the surface of both cylinder and piston rings with a smooth layer, firm and unbroken, of very low co-efficient of friction and great wearing qualities. These graphite surfaces require infinitesimal clearance and move over one another with the least possible sacrifice of power in overcoming "internal friction."

Better compression is thus secured, and, at the same time, friction lowered, and a coating provided for the cylinder walls that makes "freezing" of the piston and scoring or cutting absolutely impossible.

DIXON's publications sent free upon request.

INTERESTING PUBLICATIONS.

The Joseph Dixon Crucible Company have been the originators and promoters of all the different graphite products, many of which have a world-wide reputation, while others are not, as yet, so well known.

The Dixon Company have also been very prolific writers on the various uses of graphite. All the circulars and pamphlets issued by the company have been written with the greatest care, with the result that they are considered as standard authority and are found on file in many colleges and public libraries throughout the world.

Incidentally it may also be remarked that these same circulars and pamphlets have formed most excellent "copy" for authors who have ventured into the field of graphite industry.

Graphite as a Lubricant.—In this pamphlet, graphite as a lubricant is scientifically and practically considered, with notes upon its manifold usefulness.

Oil vs. Grease.—In this pamphlet one will find discussed the vexed questions: "Is Grease Better Than Oil?" "Is Oil Better Than Grease?" "Where Is It Better to Use Oil and Where Grease?" This pamphlet also shows wherein lie the special advantages of Dixon's Graphite Greases.

Dixon's Graphite Suggestions.—So many and so peculiar are the properties of graphite that no other single substance can possibly perform the same functions. In "Graphite Suggestions" will be found a few of the more important uses of Dixon's graphite.

The Manufacture and Care of Plumbago Crucibles.—By John A. Walker, vice-president, treasurer and general manager of the Joseph Dixon Crucible Company, is a very comprehensive pamphlet on crucible making, the care of crucibles and the causes of failure of crucibles. The pamphlet also includes a description of plumbago crucibles, bowls, stoppers, nozzles, muffles, dippers, stirrers, retorts, and special graphite or plumbago refractory vessels or goods made by the Dixon Company.

Graphite Afloat and Afield.—This pamphlet is an explanation of many of the Ticonderoga Flake Graphite preparations of the Dixon Company, and their special application to yachts and launches, rowboats, fishing rods, rifles, guns revolvers, etc.

Running Steam Cylinders Without Oil.—A discussion of the merits of flake graphite as a lubricant for steam cylinders; including first, observations by an engineer of great experience; second, a caustic criticism of the writer with an amazing challenge of widely-known facts; and third a reply and commentary by those best qualified to discuss the subject intelligently.

Dixon's School Pencils.—This pamphlet contains a very complete description of the various lead pencils, colored crayons, erasers, etc., that are used so extensively in the schools throughout the United States. It is published for the convenience of all those who are interested in the sale purchase, or use of school supplies.

Dixon's Index for Pencil Users.—Few people need to know all about lead pencils, but everybody ought to know something about them—what pencil, for example, is made and intended for the kind of work they do with a pencil. This pamphlet will prove a guide to the right pencils.

Pencil Geography.—This little pamphlet is specially designed for boys and girls, and every boy and girl should have the pleasure of possessing a copy.

Any of these pamphlets will be sent free of charge to interested parties.

THE GREAT AMERICAN HEN.

The great American hen, thrice hail! Here in very sooth is a subject for an epic. In his annual report Secretary Wilson says the farmers' hens produce one and two-third billions of dozens of eggs every year. Think of that! Under a beneficent republican administration the hens of the American farmyards produce annually 1,666,666,666, dozens of eggs. What is the wealth of a Monte Cristo compared with the wealth produced by these cheerful clucking, industrious denizens of the barnyard? It invites the mind to rhapsodical flights of fancy.

—*Rochester Post-Express.*

A PROBLEM IN ENGINEERING.

A Scotchman who had been employed nearly all his life in the building of railways in the Highlands of Scotland, went to the United States in his latter years and settled in a new section on the plains of the far West. Soon after his arrival a project came up in his new home for the construction of a railway through the district, and the Scotchman was applied to as a man of experience in such matters.

"Hoot, mon," said he to the spokesman of the scheme "ye canna build a railway across the country."

"Why not, Mr. Ferguson?"

"Why not," he repeated, with an air of effectually settling the whole matter. "Why not? Dae ye no see the country's as flat as a floor, and ye dinna hae ony place whatever to run your tunnels through."—*Spare Moments.*

"A FRIEND IN NEED."

An Engineer in Trouble and a Good Friend To the Rescue With a Can of Dixon's Flake Graphite.

The following letter comes to us unsolicited from an engineer who has demonstrated his ability and right to all the title signifies over a period of forty-seven years. Mr. Goff served with distinction on the monitor "Chickasaw" in Admiral Farragut's fleet in that great naval battle of August 5th, 1864, and, during the forty intervening years, has been an unusually successful engineer, devoting himself chiefly to the operation of stationary plants.

He has contributed many interesting articles to the engineering papers, several of them dealing with his experiences with graphite as a lubricant.

The letter tells its own interesting story:

Editor "GRAPHITE:"

I want to tell you and your readers how a cut cylinder and rings were made as good as new by the use of Dixon's Pure Flake Graphite. A friend, who is an engineer in a near-by flouring mill, came to me one Sunday, recently, and said: "I took off the cylinder head of my engine this morning and found the cylinder and rings badly cut. What shall I do about it? The engine isn't fit to run in this condition, but we can't shut down to have cylinder re-bored and new rings put in. We're behind, now, on our orders for flour, and must keep the engine going, somehow, night and day, until we catch up on orders. What would you advise?"

I thought at once this would be a fine opportunity to try graphite. I asked my friend if he had any on hand and he said no, but that he could get it at a hardware store in town. I told him to get a one-pound can of Dixon's Pure Flake Graphite, mix a quantity of the graphite and valve oil together and swab the cylinder well with this mixture. I advised, further, to take an oil cup, which he found in his engine room, and to have the hole drilled out to one-quarter of an inch, attach the cup to the cylinder where it had been tapped for an indicator, and to fill this cup with dry flake graphite, at intervals, while the engine was running. He did this and ran from Monday morning until the following Saturday night without a stop, using about two tablespoonfuls of dry graphite each day, during the six days' run.

On the following Sunday morning my friend took off the cylinder head to observe the condition of the cylinder and rings, and certainly was astonished. He found the deep cuts in the bore of the cylinder nearly filled with graphite, and the cylinder in much better condition than when the six days' run was started. He gave the cylinder another good swabbing with the mixed valve oil and graphite, and started on another six days' run, using dry graphite in the cup, as before.

He has now been using graphite in his engine cylinder, as above, for about six weeks. The cuts in the cylinder and rings are scarcely perceptible, the cylinder and rings have taken on a high polish, and now my friend sees no reason for reboring the cylinder or putting in new rings. He thinks that in a short time all signs of cutting will have wholly disappeared, and is the most delighted man I've ever seen.

In all, about a quarter of a pound of graphite was used, and the usual amount of valve oil, about four drops per minute, was fed into steampipe while the engine was running. Now, think for a moment of the value of graphite in this case. It saved a shut-down for a week, at a busy time, and the cost for repairs of at least twenty-five dollars.

I advised my friend to use a liberal amount of graphite when packing the piston rod and valve stem, and also on all bearings of engine. He has done so, and he tells me, since using graphite, he can turn the engine off centre *alone*, whereas it required *two* men to turn the engine off center previously.

He says he will never be without a supply of Dixon's Pure Flake Graphite in the engine room, and will never tire of singing its praises.

Sanger, Texas. (Signed) A. H. GOFF.

DIXON'S EVERLASTING GRAPHITE AXLE GREASE.

What a Well-Known Editor Says About It.

17 STATE STREET,
NEW YORK, Aug. 29, 1904.

In answer to yours of the 24th in regard to Dixon's Axle Grease, I would say that my young man has been away from home and I have been unable to get a report from him sooner. He now reports in writing as follows:

"Heretofore I have been in the habit of greasing our carriage axles once a week. After cleaning them off and making an application of Dixon's Everlasting Graphite Axle Grease, I found at the end of the week that they needed no lubrication on either the surrey, runabout, or farm wagons, so I let them run another week and then found them in excellent condition — in fact, it was hardly necessary to renew the 'Everlasting' then, but I thought it best to do so, as I might forget to grease them altogether.

"Another advantage over the axle grease we have been using, is that the 'Everlasting' is clean and does not run out on the hubs of the wheels."

It seems to me that this should be a strong enough recommendation for any axle lubricant yet invented.

It is safe to say that I shall now continue to use the "Everlasting" and recommend it to my friends who have been obliged to lubricate once a week.

Sincerely yours,
(Signed), GEO. L. NORTON,
Editor *Marine Journal.*

The vulture beats the record of birds for flight, traveling 150 miles an hour; the elephant is the longest lived of animals, living 100 years; the flea is the strongest insect relatively, leaping 200 times his own length, and the beetle is the strongest of all insects, as it is able to move a mass 1,200 times its own weight.

ECCENTRIC.

Burgess—Oh, yes; Charley is all right; a little eccentric, though. I've noticed several times when he has borrowed a lead pencil, instead of putting it into his pocket, as any one else would do, he hands it back to the owner.

—*Boston Transcript.*

LETTER PRESS COPY VS. BLUE-PRINT.

An Excellent Use For Dixon's "Eterno" Copying Pencil That Will Interest All Engineers and Machinists.

We recently received from Mr. John F. Skinner, special assistant engineer in the department of engineering of the City of Rochester, N. Y., an interesting letter wherein he describes a new use for Dixon's "Eterno" Copying Pencil, and we feel sure that the readers of GRAPHITE will profit by this ingenious short cut through the old method of drawing, tracing and blue print. Mr. Skinner had told one of the Dixon salesmen that he frequently made working drawings and sketches with indelible pencils, copying them in the letter press and sending out the originals, and spoke enthusiastically of the convenience of this arrangement on many occasions. The sketch sent us was exceedingly plain and clear, and served its purpose exactly as well as a blue print:

ROCHESTER, N. Y., Nov. 26th, '04.

Mr. G. H. Reed, Educational Department, Joseph Dixon Crucible Company, Jersey City, N. J.

DEAR SIR:—Your favor of the 25th ult., referring to my conversation with your Mr. Condit, in regard to your "Eterno" Copying Pencil, was received. I have delayed answering it for the reason that I have had, up to this time, nothing which I thought would be interesting to you. The enclosed sketch, however, was made, as dated, November 18, and I requested the D'Olier Engineering Company, to which it was sent, to return it with the intention of sending it to you.

For our use the pencil is very convenient, though the sketches are matters of utility rather than things of beauty. This particular sketch happened to be traced over an old foundation plan of our pumping station, but very often free-hand sketches are made in somewhat the same way and for similar purposes, avoiding the delay of having a drawing, tracing and blue-print made. They carry the further advantage of being a portion of the letter which they illustrate and of being on file in the copy-book together with the letter. We find that they copy in about the same way as the typewritten matter made with purple ribbon.

Very truly yours,
(Signed) JOHN F. SKINNER,
Special Assistant Engineer.

HOW ABOUT IT?

How does the necktie suit your taste?
And do the slippers fit?
Pray, is the diamond real or paste?
And is the ring a hit?
Say, is there time to catch the train
By that new Christmas watch and chain?
—*Chicago News.*

Lubrication with oil alone did very well for relatively light and slow machinery, low pressures and cylinder temperatures of former years, but the equipments of to-day are fast outgrowing the natural limitations of oil.

Dixon's Ticonderoga American Flake Graphite offers to-day the practical solution of more knotty problems in friction than any other substance known to theory or practice.

GRAPHITE FOR BOILERS.

A correspondent writes as follows: "We find that graphite is as useful in its way for the interior of boilers as it is in the form of graphite paint for exterior of boilers, such as boiler fronts, valves, pipes and iron work used in boiler setting. We paint the inside of our boilers to prevent scaling, and know of other people who do the same. We have seen samples of scales that were removed from a boiler where graphite had been used, which showed a very thin and even scale, and the engineer who had the boilers in charge, claimed that it came off the tubes with very little jarring, and traces of the graphite can be plainly seen. So the argument that appeared in one of the trade papers some time ago that graphite for the interior of boilers was 'detrimental,' does not seem to be in keeping with facts." —*National Provisioner.*

DIXON'S GRAPHITE AXLE GREASE.

Its Usefulness For Hard-Worked Wagons, and How It Compares With Ordinary Grease.

We are in receipt of a letter from a firm of market gardeners near Toledo, Ohio, in which they say:

"We have used the sample of Dixon's Axle Grease, and have also purchased a two-pound can from the dealers and are using it on the hardest-worked wagon we have, which makes two trips daily, each trip being ten to eleven miles (five to five and one-half each out and return).

"The driver informs us that he now runs nine to twelve trips with each application of your grease, whereas with ordinary grease he could only run four to five.

"Not only is this a saving of labor, but the graphite grease is also so much cleaner — the shoulders and burrs of the axles are not continually gummed up with old dried grease mixed with road dust.

"In fact, it seems to fill the bill, and we will use it in preference to all others. You may ship us a twenty-five-pound pail, for which we enclose $1 in part payment."

AS TO SUBSTITUTES.

"A substitute shines brightly as a king
Until a king be by."— *Shakespeare.*

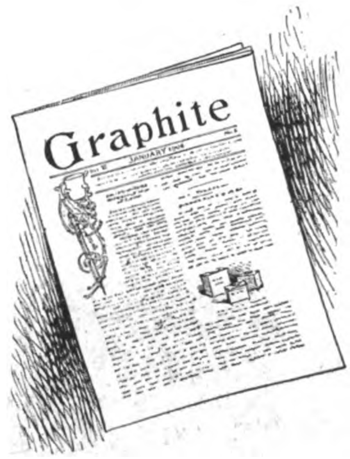
Amorphous graphites, under the label of "Lubricating Graphites," seem smooth and soft and almost fit to use, until they are put side by side with the world-famous Ticonderoga American Flake Graphite of the Dixon Company. Then they look—to borrow a simile—"like a broken-down snow-plow in August"—worse than useless.

FAST TRAVELING.

A lad with a touch of malaria,
Enlisted to fight in Bulgaria,
But before he could shoot,
A Turk hollered, "Scoot!"
And they found him next day in Bavaria.
—*Cincinnati Commercial-Tribune.*

JANUARY "GRAPHITE."

A Lubrication Special.



To bring about a better understanding of the sound principles and the theory of graphite lubrication, we published last month a special lubrication number of "GRAPHITE." There are a few copies left. If you want one let us hear from you promptly.

STEAM FITTERS, TAKE NOTE.

The man who puts a steam, gas, or water pipe together with Dixon's Graphite Pipe Compound enjoys a degree of satisfaction not experienced when any other material is used. He knows to a certainty that the joint he has made will be perfectly tight, and he also knows that whenever it is required the joint can be taken apart with consummate ease.—*Commercial Record.*

EFFECT OF LUBRICATING GRAPHITE ON ENGINE CYLINDERS AND BEARINGS.

Satisfactory lubrication depends as much upon the condition of the surfaces as upon the quality of the lubricant itself, and the smoother the bearing surface can be made, the easier it is to lubricate. This point is strongly emphasized when Dixon's Pure Flake Graphite is used in lubrication. When introduced between friction surfaces it soon rubs into the metal, filling every pore and crack and irregularity in the surfaces, coating them with a veneer of great firmness and endurance and of exceeding smoothness.

Cylinders in which graphite has been used take on a wonderful mirror-like polish and valves work quietly and without straining or cutting. Time and again overloaded engines have been able to do all the heavy work demanded of them where graphite has been used in their lubrication when they would otherwise have been stalled. Bearings on which graphite is used never overheat, and overheated bearings are rapidly cooled, and it is a fact proved beyond any question that "seizing" and cutting of friction surfaces cannot take place in the presence of graphite. Therefore in those engine rooms where it is regularly used there will never be any of those costly and perhaps disastrous results of overheated bearings.

Thinner, cheaper oils will suffice for work that formerly required the use of expensive heavy-bodied lubricants, and friction will be lowered with corresponding benefit to the coal pile. Shut-downs and repairs will be fewer and much trouble saved.

Graphite lubrication has long since passed the experimental stage and thousands of men are using it regularly with most satisfactory and paying results.

GRAPHITE FOR AIR COMPRESSORS.

We have an interesting letter from Mr. A. D. Austin, of Humboldt, Kan., who is running a Rand Duplex Compressor for the Lincoln Oil and Gas Company. He had been troubled with rings clicking in the cylinders, but after using a small quantity of Dixon's No. 2 Flake Graphite, the clicking was stopped and the oil consumption reduced fifty per cent.

THE THEORY OF LUBRICATION.

A writer on the above subject explained it very clearly in the following words: "The theory of lubrication is that, in spite of all that can be done to polish and smooth a bearing surface, minute roughnesses still remain, whose dragging tendency, when two such surfaces are rubbed together under pressure, is aggravated by the natural tendency of two metal surfaces in close contact to adhere."

The dragging tendency when two surfaces are rubbed together under pressure, and the natural tendency of two surfaces in close contact to adhere, is very largely overcome by the introduction of Dixon's Ticonderoga Flake Graphite between such surfaces.

Dixon's Ticonderoga Flake Graphite is a graphite of marvelous thinness of flake, and possesses a smoothness and toughness not found in any other graphite.

The minute thin flakes of graphite fill up all the roughnesses and microscopic irregularities of surfaces, forming a thin coating or veneer of wonderful smoothness and endurance.

In theory and in practice Dixon's Ticonderoga Flake Graphite stands without a rival as a lubricant.

RE-BABBITTING A BOX.

When all ready to run the melted babbitt into a box, thoroughly dust and coat the surface of the mandril with Dixon's Flake Graphite — finer flake. This will absolutely prevent the molten metal from sticking and is a much better method than wapping the mandril with oiled paper or other tricks of that sort.

Did you ever feel of any perfectly smooth flake graphite? It is the most marvellously smooth substance known to science. If you once feel of it, you will immediately understand its great value as a lubricant.

One practical test always makes practical men enthusiastic converts of the better lubrication.

A PARODY.

I met a little Mormon girl;
  She was just eighteen, she said.
Her hair was dressed with one big curl
  That dangled from her head.

She had a simple way, and bland;
  Her speech was soft and cool,
And in her honest, widespread hand
  She bore a milking stool.

"How many children, little maid,
  Are in your family?"
"How many? Sixty-seven," she said,
  And shyly looked at me.

Her hazel eyes to mine she raised,
  And then she cast them down.
"I did not ask," I said, amazed,
  "The census of your town.

"How many children 'round your door
  Disport in childish glee?"
"Just sixty-seven," she said, once more,
  And smiled again at me.

"Forty of us at Provo dwell;
  At Ogden there are nine.
The good ship Jane, they sail her well—
  Twelve brothers, dear, of mine."

"I see at last. Your meaning's clear,"
  Said I, with laughter merry;
"Is it an orphanage, my dear,
  Or a female seminary?"

"My father kind is drawing near,"
  The little maid replied;
"He's been to roam; he's bringing home
  Another brand new bride.

"With father dear we dwell at peace;
  Our mothers are eleven;
'Round every door there's room for more,
  And we are sixty-seven."

And then I left in dumb dismay
  The maid with eyes like heaven;
But as I left I heard her say,
"And I'm the oldest, by the way,
  Of all the sixty-seven."

—*Council Bluffs Nonpareil.*

IT IS SAID OF BOSTON—

That they cut the pie "from center to the periphery," and that when one desires to have the butter passed to him, he says:

"Please, pass me the butter if it is within the sphere of your influence."

What would the humorists do without Boston, Chicago, Philadelphia and Hohokus!

Madeira, Ohio, Oct. 26, 1903.

I received the sample Dixon's 'Eterno' pencil, and think it indeed a very nice pencil. Please accept thanks for the same. J. Muchmore.

CRUSHED CRUCIBLES.

As Part of Sand Outfit in Foundry.

In many steel foundries, crushed crucibles are the chief part of the sand outfit. In fact, old crucibles, fire brick, clay, quartz, and even graphite, are all best bought in lump and crushed on the place, thus insuring rejection of the contaminations introduced when these materials are bought ready made. Quartz should be heated to redness first, then crushed, so that any organic matter found is destroyed, which would otherwise cause trouble in the mold.

The mixing is done in the mill, the clay and graphite being added last. Here are several good mixtures.

For castings up to two inches thick — all qualities given being by measure and not by weight:

	I.	II.
Old facing sand	8	12
Old crucibles	2	..
Fire brick	2	..
Clay	2	1
Coke	1	..
Quartz sand	..	5
Graphite	..	2

For castings over two inches thick, similarly:

	I.	II.
Old crucibles	10	..
Fire brick	5	..
Clay	3	1
Ground coke	1	..
Old facing sand	1	..
Quartz sand	..	5

—*The Foundry.*

MYSTIC HEALING SALVE.

We receive very many most curious and interesting letters and requests from all parts of the world. We think, however, that the following is about as good as anything that has come to us for some time:

Dear Sir we are going to Manufacture a wonderful, mystic healing salve. And in order to make it known it is necessary to sent a letter to you, and stated that this salve is good for the following ailment as folow. Soars cuts burns scalding and many other which is printed on the label, and place on every box. The price that we are going to charge is twenty-five cents per box at retail. And to the Dealer who wish to have wholesale price, it is necessary to wright a letter, and we will quote the price that he will make a good profit, with the understanding that agent are wanted also. This salve should be kept in every house, so Incase of any ailment, place it on the article and it will heal while the person is resting. Oblige.

SOME DIXON PRODUCTIONS.

Plumbago Crucibles for every melting purpose.

Foundry Facings to meet every casting requirement.

Pure Flake Graphite for every lubrication duty.

Graphite Greases for use whenever a grease is indicated.

Silica-Graphite Paint for all bridges, iron work and steel cars.

"American Graphite" Pencils for every regular and special use.

MAKING UP THREADED JOINTS.

At the annual meeting of the American Society of Heating and Ventilating Engineers, reported in the *Engineering Review* of last February, we find the following, which we think will be of interest to our readers:

In making screwed joints is it better to use some compound, or make them iron to iron, with no compound?

DISCUSSION.

Mr. Barron: The practice in New York, very largely, is to make joints iron to iron, and not to use red lead, or any of the various compounds that have been devised for the purpose. But recently, on high pressure work, a great many engineers have found that compounds seem to have some advantage, and two or three parties are introducing compounds for that purpose, putting them up in packages and advocating their use. I think, therefore, it is a topic that will have to be discussed by those who are using anything of the kind. In my own practice it is exceptional to use anything: we use metal to metal. But I know there are others whose practice is different. In the old days of pipe fitting nobody would think of putting up pipe without something on the joints; but in the last five or six years in New York that practice has been abandoned on the average, and the fitter puts up his work, whether for high pressure or low pressure, metal to metal.

Mr. Cary: I quite agree that metal to metal joints are much preferable. But I have had more or less experience with piping that has been done lately, and I find a lot of bad piping. It is almost impossible sometimes to make up joints without using some kind of "dope," as it is called. The use of linseed oil, mixed into a thin paste with plumbago or graphite, I think, makes a very good joint. I have no objection to that being used in my work, and I have had excellent results from it. If a joint has ever to be taken apart again, it can generally be broken easily. It helps to fill up a little bit and makes it somewhat easier than putting it metal to metal; and in screwing the pipe up, you have a little lubrication there, and are able to set up your pipe more solidly than when no lubrication is used. A little oil should be used anyway, even if it is a metal to metal joint.

Mr. Lyman: I would like to ask if in making up a fitting with linseed oil it is not really then a "dope"? If made with lard oil, or a simple lubricant, it would be different but is not there a little of the nature of stickiness in the other, which helps to make the joint tight?

Mr. Cary: I do not remember speaking of the use of linseed oil alone in making up a tight joint, but in connection with graphite it seems to hold the graphite in position better than lard oil or other oil. I agree with the gentleman that linseed oil may be in the nature of a compound or "dope."

Mr. Kenrick: I think the greatest trouble in using compounds is the manner in which they are used. Instead of putting the compound on the inside, on the female end of the fitting, they should put it on the male end, while on the female end it is allowed to roll along and accumulate material, and more so with graphite than with red lead.

Mr. Cary: Graphite should be put on with the consistency, say, of table oil; very thin, and painted on.

The trouble in putting compounds in the female end of the pipe is that as you put the male in, and it forces the compound in front of it, it tends to stop the opening.

The President: We have used red lead, but are careful to place it on the thread instead of inside, where all of it will have to be pushed out. We find that in disconnecting, some sort of lubricant should be used, otherwise our pipes become rusted in so that we cannot back them out. In ground flange work for high pressure, we use graphite with a little boiled linseed oil of the consistency of table oil. We place that on our flange, with the idea, too, of allowing it to come out freely. We also paint our gaskets with graphite and oil for the same purpose in our flange work.

In power plants we have a gravity oiling system, where the tank is placed at thirty or forty feet higher than the engine and the cylinder. We make these joints with black asphaltum. We let it become like soft butter, place it on the thread and screw it into our pipe. Our experience has been that red lead placed on the joint in an oiling system will leak.

We find that some sort of lubricant mixed with either graphite or red lead is necessary, because the fittings are not tapped right, and many of the threads that we cut on this so-called semi-steel pipe are imperfect. The pipe may look perfect on the face of it, but when you cut it with a new tool there will be little marks in through it. We have to provide something to make these joints tight, but we have to watch the steam fitter very closely. He has the greatest tendency to take the brush and run it around on the inside of the fitting.

Mr. Joslin: There is one feature that has not been spoken of. Nothing has been said about screwing them into the couplings. When you screw into fittings you screw into cast iron usually. In screwing into wrought iron it is somewhat different. The thread is more likely to go, in the wrought iron of the couplings, especially if you use a Stillson wrench.

Mr. Cary: Boiled linseed oil and graphite is a good thing to use in either wrought iron or cast iron. It seems to me that if there were more specifications drawn and more people insisting upon joints being made up without red lead, or any of these other compounds, with nothing more than oil or some very thin lubricant, that it might be a means to the end that we all desire to reach. We are getting an awful lot of bad piping, and we have found a good many split couplings. They split or open as soon as you get your steam on. We have had a good deal of trouble with couplings lately, and there should be something done to stop this bad pipe work. We should have pipes on which we can cut a good, clean thread, and if we can suppress the use of so much of this compound or "dope" we may be able to get it. We need better material. It seems to grow worse all the time.

Graphite

VOL. VII. MARCH, 1905. No. 3.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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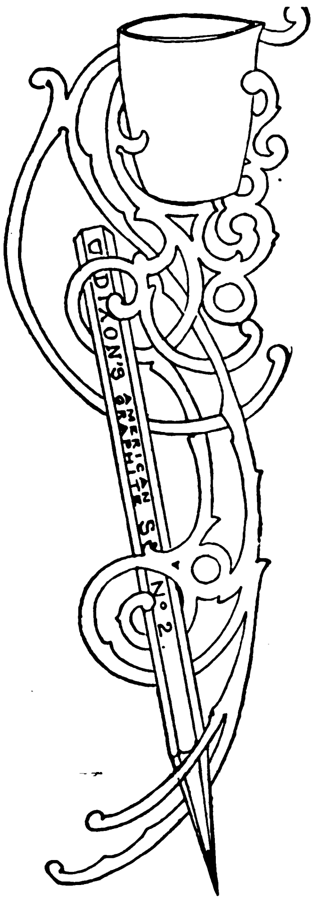


MYSTERIES OF FLORIDA.

Florida, the land of the pencil cedar, the straight-grained wood which forms the cases of Dixon's world-famed "American Graphite" pencils, is a land of wonders and mysteries.

February *Century* says: "In the little museum at Modena, in Italy, may be seen a Portuguese map, made about 1502, delineating the peninsula of Florida.

"It shows the coast line and general topography with some detail, and even indicates certain of the rivers. It is one of the two earliest known maps of any part of the Northern Continent.

"It is a curious fact that while this peninsula was thus of all North America one of the first parts to be mapped, the tip of it is the last to be intimately explored.

"The Great American Desert, once so called, the wild solitudes of the Western mountain ranges and the snow wastes of the Yukon, have yielded up their inmost secrets; but the Everglades in the southernmost interior of our southernmost State, are to-day almost as little known to white men as when the early navigators first chartered the contour of the 'Cape of the End of April.'

"The Everglades as a part of Florida, are happily named. What term could more felicitously blend with all the popular associations clustering about a land of flowers and of perpetual youth? The sunlit recesses of such a land must surely be everglades of life and promise and the springtime.

"Not only the name fascinates, but the mystery. Here is a vast region close to inquisitive pioneer life, bordered by lines of commerce and fashionable travel, and yet as unplotted and almost as unvisited as the Darkest Africa of our school day atlases. A few hundred Indians share its hidden life, thread its silent water-paths, and are at home in the heart of it; but the white man does not follow. They disappear from his sight as into another planet, and he stands upon the brink gazing curiously after them."

IT OFTEN HAPPENS SO.

Every shipper of goods, whether he is a manufacturer or merchant, experiences the annoyance of claims for shortage of goods. Sometimes the correspondence concerning such claims becomes more or less heated because each party is very certain of the correctness of his claim. It often happens that unless the receiver of the goods has a checking-up system as excellent as the usual manufacturer, that the manufacturer or merchant is found to be in the right.

A short time ago we had a claim for shortage of goods and we tried to be as pleasant as possible and yet took a firm stand because of our very thorough checking system. It ended by our receiving the following letter—we of course omit names.

January 23, 1905.

Joseph Dixon Crucible Co., Jersey City.

GENTLEMEN:—On receipt of yours of January 16th, I personally made an examination of the case in which pencils were shipped and found that the shortage reported was due entirely to the carelessness of the clerk who made examination of package originally. The case contained fifty half-gross boxes as billed, and statement was duly approved and check has gone forward today. Kindly accept apology for the inconvenience caused you in this matter.

We find that we shall need a further order of fifty (50) gross to complete our requisitions, and would ask that you place an order for this quantity in the works and make shipment at as early a date as possible.

THE RESULT OF A "HOLLER."

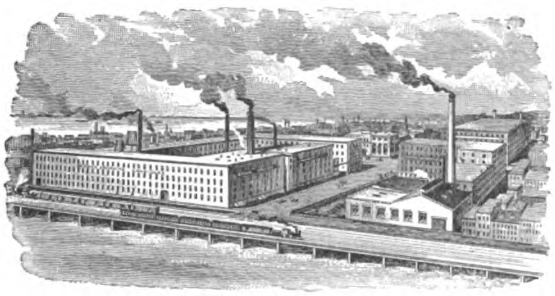
When a man gets into trouble he should always "holler." The editor of the *Press* sat down to write an item the other day and the pencil broke. He whittled it off and started again. Another break! Then he used a pencil sharpener. Then the miserable lead crumbled. At last we got a point on the lead and sailed in. But a grain of sand or something as hard, prevented the pencil from "taking hold." Forthwith we grasped a pen and laid the whole case before the Joseph Dixon Crucible Company of Jersey City, N. J. In other words, we threw ourselves on the mercy of the court.

We explained through burning tears that if they made the kind of pencil we required to hustle 'em on by fast freight; and behold, on New Year morning they reached us, a big bundle, too! What a blessing! Just note the improvement in the *Press* henceforth! Once more we're happy! But the biggest joke of it all is that these same blessed pencils may be had right here in Long Beach and Compton, but we didn't know a solitary thing about it. It pays to advertise. Selah.

—*Los Angeles County Press.*

"Unless a man employs some men cleverer than himself he can never become great."

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

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JERSEY CITY, N. J., March, 1905.

THE DIXON BELT DRESSING.

A useful little booklet has been issued by the Joseph Dixon Crucible Co., of Jersey City, N. J., on the care and renewal of belts. Notwithstanding the importance of power transmission without loss and interruption, the belting in the average shop or mill is usually neglected, unless something goes wrong. These belts should receive careful attention, because a slipping belt wastes power and lowers the efficiency of the machinery, and a neglected belt soon wears out, and this means the renewal of the belting at considerable cost.

This booklet deals with the causes of the slipping of belts from overloading, clogging up, glazing, or drying out. The question of slack belts and over-tight belts is also dealt with. The work concludes with an investigation of the belt dressings now employed—vegetable and animal oils, resin, waterproof dressing, etc. The advantages of Dixon's belt dressing are effectively pointed out and specific directions are given for its application. Those interested can obtain a copy of this booklet upon application. —*Brick.*

FRIENDS.

Each man should see that in this life he makes a few firm friends, for enemies will make themselves, and there the matter ends.—HAROLD MELBOURNE in *Lippincott's.*

EXPERIENCE AND OPPORTUNITY.

Take a sharp contrast. On the one hand, President Roosevelt's daily life and, on the other, the life of a pie-apple vender.

Every day the President sees, say from one to two hundred visitors, the cream and pick of the whole world. Authors, scientists, railroad presidents, poets and captains of industry are invited to his luncheon table. To his office troop senators, governors, cabinet officers, representatives, ambassadors —home and foreign.

Think of the variety of subjects gone over. Every branch of home and foreign statesmanship; peace treaties with nations ten thousand miles away; the building of canals, huge ones, and on every topic the President must be found with ready knowledge to discuss a hundred questions a day —all large topics and with the best brains in the world. Think of the intellectual life this involves, and also the moral life, because if he poses not sincere he becomes at once no good as an adviser.

Think what opportunities this one man has; what it is to "rub up," as the phrase is, with the most clever men in the land every day. How much he must read, or have read for him, to get in touch with so many things; the necessity of an inspiring enthusiasm, of a sound judgment, of rapid assimilation, and then turn to the man at the other end of the line who "hawks" pie-apples.

I talked with one such the other day. Asked how he bought his fruit. He answered, "By the barrel." "And how sell it?" "By the half peck measure." "How many half pecks in a barrel?" I continued. "Never counted," he answered. "How do you know how to arrive at the half peck price?" I said. "I guess at it, and if I have more money at the day's close then at the day's start, I know I've made a little." Then look at his outfit. A friend wittily said his animal is a "Gothic horse" and the one horse shay in its collapse, an improvement on his wagon.

There is a difference to be noted here as to mental power, but this we will not touch, at this writing. The point in mind now, is the difference in experience. One sees everybody; the other, nobody. One the great and learned; the other, the lowest grades. One talks in high strain on topics of international concern; the other of pie-apples.

The lesson is that experience is better than mental power; it is within easier grasp.

Try and widen your vision. Enlarge your acquaintance with those above you, read more, talk more, get out more into the open, and life will be richer and much more enjoyable.

—J. A. WALKER.

THE use on threaded joints is only one of a score of good applications of Dixon's Graphite Pipe Joint Compound. Bolts, nuts, studs, flanges, gaskets, everywhere that tightness is wanted and with the possibility of easy separation at any time.

Dixon's Graphite Compound never "sets."

ROCK drills are not high in mechanical efficiency, but their lubrication, like that of engines, compressors, pumps and hoists, is very greatly helped by the judicious application of Dixon's pure flake graphite.

REDUCTION OF LOAD ON STEAM ENGINES.

Effect On Indicator Diagrams.

By W. H. Wakeman.

Chapter II.

Let us note the effect on quantity of steam called for under conditions represented by the indicator diagrams shown in Chapter I., assuming that they were taken from an engine with 20 x 42 inch cylinder, speed 90 revolutions per minute.

The area of a 20-inch circle is 314 square inches. Dividing this by 1,728 (the number of cubic inches in a cubic foot), we find that each inch in the stroke of this engine represents .1817 cubic foot in the cylinder. The cut-off takes place at one-quarter stroke in Fig. 1, or after the piston has traveled $42 \div 4 = 10.5$ inches. In Fig. 2 it takes place at one-fifth stroke, or after the piston has traveled $42 \div 5 = 8.4$ inches. The difference is $10.5 - 8.4 = 2.1$ inches, representing $2.1 \times .1817 = .38157$ cubic feet per stroke. As the engine makes 180 strokes per minute, it means that 68.6826 cubic feet less are required. Steam at this pressure weighs .283 pounds per cubic foot, therefore the reduction amounts to $68.6826 \times 283 = 19.5$ pounds per minute, or 1,170 pounds per hour.

It will be both interesting and instructive to note the horse power at the boiler that this represents. The first move is to determine the "factor of evaporation." The meaning of this term may be briefly explained as follows:

When steam is carried at 70 pounds pressure by the gauge, and water goes into the boiler at 100° Fah., the evaporation of 30 pounds of water per hour constitutes one horse-power. Where steam at a higher or a lower pressure is used, and the temperature of feed water is higher or lower, the quantity of water required for one horse-power is not the same, but is determined by multiplying 30 by a factor which is found as follows: From the total heat of steam at given absolute pressure, subtract the total heat of water at given temperature, and divide by 967.5. This is the "factor of evaporation."

In this case the pressure is 125 pounds, the total heat of which is 1,186.9. The temperature of feed water is assumed to be 200° Fah., the total heat of which is 168.75. Then $1{,}186.9 - 168.75 \div 967.5 = 1.0543$, which is the "factor of evaporation" for given conditions. The weight of water evaporated in this case to equal one horse-power is $30 \times 1.0543 = 31.63$ pounds per hour. The reduction due to less friction was 1,170 pounds, or $1{,}170 \div 31.63 = 37$ horse-power at the boiler.

If 8 pounds of water are evaporated for each pound of coal burned per hour, this means a reduction of $1{,}170 \div 8 = 146$ pounds per hour, or 1,460 per day of 10 hours.

When the difference in power at the engine, shown by these two diagrams is determined, it becomes an interesting feature.

The horse-power constant of an engine is the power developed for each pound mean effective pressure in the cylinder. For engines that run at a given speed (as all mill and shop engines are supposed to do), it is found by multiplying the area of piston by its speed in feet per minute, and dividing by 33,000. In this case it is $314 \times 630 \div 33{,}000 = 5.9946$.

The next important point to be considered is the mean effective pressure indicated by the diagrams Figs. 1 and 2. As these are ideal diagrams, the rule for determining mean effective pressures, when conditions are known, can be applied without danger of serious error. It is as follows: To the hyperbolic logarithm of the ratio of expansion add 1, multiply by the initial pressure, divide by the ratio of expansion and subtract the back pressure.

The ratio of expansion in this case is 4, as already explained, and by referring to a table which is found in nearly every engineer's pocketbook, we find that the hyperbolic logarithm of 4 is 1.3863, and when 1 is added it becomes 2.3863. Then $2.3863 \times 120 \div 4 = 71.58$ pounds mean, or average pressure.

I wish to call special attention to the fact that this is the mean pressure and not the mean effective pressure. They are not the same and never can be. On all non-condensing engines there is a difference of at least 15 pounds when the barometer stands at 29.9 inches, as already explained. On high-grade condensing engines the difference is reduced to 2 pounds, but some difference will always exist until we find a way to maintain a perfect vacuum in our condensers, and that seems impossible at the present state of the art of steam engineering.

Authors of books written for steam engineers do not always understand this point, as they get the two pressures so thoroughly mixed that it seems impossible to straighten them out.

Fig. 1 shows a back pressure of about 4 pounds above the atmosphere (including the compression), and 15 pounds below it, or a total of 19 pounds. The mean effective pressure is $71.58 - 19 = 52.58$ pounds.

Multiplying the horse-power constant by the mean effective pressure, gives the indicated horse-power. Here it is $5.9946 \times 52.58 = 315.19$ horse-power.

Applying the same rule to Fig. 2 we find that the ratio of expansion is 5, the hyperbolic logarithm of which is 1.6094. Then $2.6094 \times 120 \div 5 = 62.62$ pounds mean, or average, pressure. The back pressure is 19 pounds as before, therefore the mean effective pressure is $62.62 - 19 = 43.62$ pounds. The power developed is $5.9946 \times 43.62 = 261.48$ horse-power.

The difference is $315.19 - 261.48 \div 315.19 \times 100 = 17$ per cent. This result is on a very conservative basis, as a much larger saving is frequently made, especially in old plants that have not been well cared for.

Another way to calculate the difference is to subtract the mean effective pressure of Fig. 2 from Fig. 1 and multiply the horse-power constant by the remainder. Then $52.58 - 43.62 = 8.96$ pounds mean effective pressure; $5.9946 \times 8.96 = 53.71$ horse-power.

This illustrates an important point that is not generally understood by steam users, namely, the boiler horse-power and the engine horse-power are very seldom the same, although it is possible to create conditions under which they would agree. The boiler horse-power accounted for in this case is 37, while at the engine it is 53.71 horse-power, although both calculations are based on the same pair of diagrams.

In the former case 1,170 pounds of water per hour were saved, as before demonstrated. If this is divided by 53.71 the quotient is 21.78 pounds of water per horse-power accounted for at the point of cut-off.

This is good practice, but is not impossible. Before me as I write there is a pair of diagrams taken from a Corliss engine, that resemble Figs. 1 and 2. Weight of steam accounted for per horse-power per hour at cut-off is 21.77 pounds, and while this may be regarded as a coincidence, it has been equalled many times in every-day work.

As Figs. 1 and 2 illustrate ideal diagrams from an automatic engine, change in the point of cut-off very plainly indicates a difference in the quantity of steam measured out at each stroke, but where a throttling engine is used, the point of cut-off does not change with the load, therefore any difference in this respect must be shown in another way on the indicator diagram.

Large engines of this type are sometimes used in sawmills, as they are adapted to conditions frequently found in such places. The diagram shown in Fig. 3 is a fair specimen of this class. It is assumed that the engine cylinder is 20 x 30 inches, speed 125 revolutions per minute, and the cut-off takes place at three-quarter stroke, or when the piston has traveled 22.5 inches.

We will now proceed to determine the cubic feet of steam used per minute by this engine. Area of cylinder 314 square inches, and as before stated, each inch in the length of stroke represents .1817 cubic foot; therefore up to the point of cut-off this cylinder contains $.1817 \times 22.5 = 4.09$ cubic feet. This is the amount used per stroke, and as there are 250 strokes it calls for $4.09 \times 250 = 1{,}022.5$ cubic feet per minute. This is used continuously, regardless of the load carried, but the amount of water evaporated by the boiler when supplying this engine with steam, varies with the load.

The two foregoing statements may seem inconsistent to some readers, but they are not, as the following explanation shows: Fig. 4 represents an ideal diagram taken from the same engine as Fig. 3, but after improved lubrication of the bearings throughout the shop, also in the cylinder of engine, has reduced the load, in the same manner, although not necessarily in exactly the same proportions as with the automatic engine previously described. All of these diagrams are introduced to illustrate principles involved, rather than to show what transpired in any particular case.

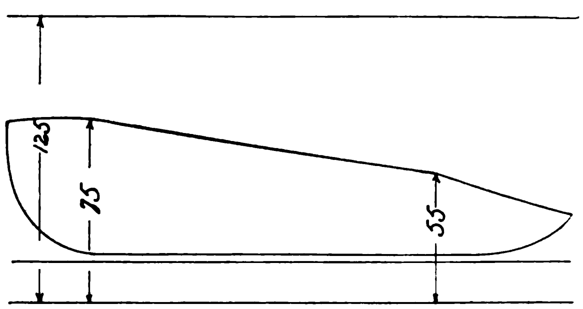


FIG. 3.

With a boiler pressure of 125 pounds, the highest secured in Fig. 3 is 75, and even this is not maintained, for at the point of cut-off it is reduced to 55 pounds. This reduction of pressure is due to the rapidly increasing speed of piston as the crank nears the first quarter of its revolution, starting from the inside center and running "over," or, in other words, when the top of the fly wheel travels from the cylinder. These conditions are specified in order that the reader may intelligently follow the assumed action of the engine. The motion of piston is practically the same if an engine runs "under."

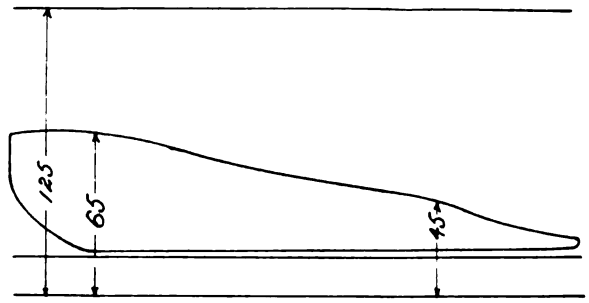


FIG. 4.

In Fig. 4, with the same boiler pressure, the highest realized in the cylinder is 65, which is reduced to 45 pounds at the point of cut-off at three-quarter stroke. All of these pressures are absolute.

When calculating the weight of steam used by this throttling engine, it is proper to take the point of cut-off as a basis, as steam is flowing from the boiler to the cylinder during this portion of each stroke. It is also proper to take the pressure existing at this time, for although it was higher at another point, this steam was partially expanded, thus lowering the pressure until the valve closed and shut off the supply.

In the case of Fig. 3 we have 1,022.5 cubic feet per minute at 55 pounds pressure, weighing .1311 pound per cubic foot, amounting to 134 pounds.

Fig. 4 represents 1,022.5 cubic feet of steam at 45 pounds pressure, weighing .1086 pound per cubic foot, or a total of 111 pounds. The difference is $134 - 111 = 23$ pounds per minute, or 1,380 pounds per hour.

As already explained, it requires the evaporation of 31.63 pounds of water per hour from feed at 200° Fah. into steam at 125 pounds absolute pressure to constitute one horse-power; therefore the above difference equals $1{,}380 \div 31.63 = 43.6$ horse-power at the boiler.

If 8 pounds of water are evaporated for each pound of coal burned, the saving will be $1{,}380 \div 8 = 172$ pounds per hour, or 1,720 pounds per day.

The horse-power constant of this engine is $314 \times 625 \div 33{,}000 = 5.947$.

It is not practical to apply the rule for determining the mean effective pressure already given to Figs. 3 and 4, owing to the fall of pressure during admission and the varying back-pressure, but it is not difficult to see that the difference between the two is 10 pounds mean effective pressure.

The difference in power developed can be found by multiplying the horse-power constant by the difference in mean effective pressure as before. Then $5.947 \times 10 = 59.47$ horse-power.

The foregoing statements are intended to call attention to the benefits derived from superior lubrication of the shafting and engine in a mill or shop, showing that the best lubricants are cheaper than those of inferior kinds. When this is extended until it includes all machinery used, the benefits are greater in proportion.

DIXON'S TICONDEROGA FLAKE GRAPHITE.

A Locomotive Engineer's Experience With It.

I beg to be excused for my delay in answering your letter of September 30th. I received your samples of Dixon's No. 1 and No 2 Flake Graphite. The box of No 2 was robbed in our roundhouse, as it was sent there and put in the engineer's mail box. There was left for me about a tablespoonful, and I mixed it with valve oil and put it in the air cylinder of my air pump which had been groaning for over a month. It has not groaned since.

I always give my pump a little oil in the air end just after starting same, and that runs it over the division. Before I put that dose of No. 2 in it, I tried in every manner to stop the groaning but could not. Now I just give it a little oil, and that runs it all O. K. The No. 1 I used on my valves and pins. I had a broken engine truck brass and it was smoking. The conductor told me that we would surely be delayed. I told him I had a new wrinkle. I just dropped the cellar, raised the packing a little and put a light coat of graphite on top of packing; put cellar back and gave a good dose of oil from top, and ran same about sixty miles without looking at it. I went to terminal without any trouble, and it was not hot enough to smoke.

I also put a little No. 1 in the cylinders through the relief valves, and found that it required a less amount of oil and gave much better results, causing engine to handle nicely and making work easy in switching.

A GRATEFUL MAN.

And the Pride He Takes In a Dixon "Eterno" Pencil.

We have taken much pride in Dixon's "Eterno" pencil and have tried to make one of the very best (if not the best) copying ink pencils, and we have a great many nice testimonials.

We think, however, that the following, which comes to us from New York City, where people are supposed to be familiar with the best and to be very critical, shows a most grateful user:

"I am delighted with Dixon's "Eterno" pencil. I shall use it for the rest of my life."

We take it for granted that this comes from a bright and critical young man.

THE principle of adding a small percentage of Dixon's Pure Flake Graphite in lubrication is as sound as results are remarkable.

Graphite decreases friction and friction troubles by getting at the cause and rendering slides, cylinders, journals and bearings of any sort, glassy smooth.

A NEW AND VALUABLE USE FOR DIXON'S CRUCIBLE MIXTURE.

(Made of Dixon's Graphite and Crucible Clay in Proper Proportions.)

One of the largest brass casting foundries in the United States has made unique and profitable use of Dixon's Crucible Mixture, by means of which they have almost entirely done away with the use of fire brick.

A wooden cylinder is made and placed in the furnace. The space between the cylinder and the furnace wall is the same as that usually occupied by the fire brick.

Dixon's Crucible Mixture is made into a mortar by mixing with water, to which a small quantity of silicate of soda has been added—about half a pound of silicate of soda to a gallon of water.

The mixture when thus prepared is poured into the space mentioned above. The silicate of soda causes the mortar to set quickly, and the wooden cylinder can soon be withdrawn and put aside for future use. By means of the cylinder any portion of the furnace lining can be repaired or rebuilt.

The refractory nature of Dixon's Crucible Clay and Graphite will insure a more durable lining than if made of fire brick, and one far more easily and economically repaired.

In making repairs the wooden cylinder is not always required. The lower portion of the furnace, which is subjected to the greatest heat and therefore most liable to give way, can be easily repaired by breaking away the worn parts and the cracks and holes filled with the mortar made of the crucible mixture.

In some foundries the brass furnace is of the same diameter as a straight-sided charcoal barrel, and such a barrel may be used in place of the wooden cylinder, and the barrel left in and the fire started at the proper time.

AN ENGINEER'S WAY.

Some time ago a Dixon salesman met a very bright and well-read engineer, and in a short time the subject of graphite lubrication was the topic of conversation.

The engineer said: "I am, very likely, better posted by practical experience on the value of Dixon's Ticonderoga Flake Graphite than any Dixon salesman, and can put up a better argument why it should be used. I have known of its value for twenty years and I have had many a fight for it. I know there are other graphites being offered which are said to be 'just as good,' but while some of them look all right the results are bad. I am not a chemist, so cannot tell where the difference is, but it is there, and when they try to convince me against what I know from experience, I am like the incredulous person in the Ingoldsby Legends, who

"'Said nothing that would indicate a doubt,
But he put his hand unto his nose and opened his fingers out.'"

DIXON'S BELT DRESSING FOR CANVAS BELTS.

In a letter received by us, the writer says: "Please do not use this as a testimonial for publication with our name attached, but we want to say that Dixon's Belt Dressing shows up O. K. when used on canvas belting, and you may be sure of our future orders."

PURE FLAKE GRAPHITE.

Poor graphite is worse than none. Gritty graphite will cut shafts like bits of emery. The famous smooth, pure flake graphite, suitable for use as a lubricant, is found in the Dixon mines at Ticonderoga. Pure flake graphite enters into a suitably proportioned lubricant as prepared by the Joseph Dixon Crucible Company, Jersey City, N. J. For coating gaskets coarse flake graphite fulfils every requirement of tightness, freedom from rusting, and ease of separation at any time, and without injury to parts. Graphite forms the basis of a perfect lubricant for commutators, lengthens the life of wire rope, and preserves it from abrasion; prevents wear on gears of every size and character, and serves an invaluable purpose in every machine shop. It offers especial economies to textile manufacturers by greatly reducing oil consumption and lessening the losses due to oil stains on fabrics. A very large number of the best known piston-rod packings are coated or thickly impregnated with coarse flake graphite. Pure flake graphite has been employed with success in lubricating electric knife switches and the cylinders of electric car-controllers. It has a high conductivity, and does not collect dust. Manila transmission rope is usually wound about a core formed of a smaller single rope. This core is nearly always coated thoroughly with graphite to afford the internal lubrication that is so necessary to good wearing qualities. All screw joints coated with graphite can be made up absolutely tight, will not rust, and will always come apart readily when desired. For pipe threads, bolts, flanges, studs and screws, a thick mixture of flake graphite and oil may be used, although the company prepares a "Graphite Pipe Joint Compound" that is especially recommended for this purpose. It is much more economical and far better than red or white lead.—*Scientific American Bldg. Monthly.*

ANOTHER CONVERT.

In locomotive service the benefits of flake graphite are more than ordinarily conspicuous because of the tremendously difficult task that engineers have in keeping everything cool on a limited oil allowance. The following letter comes from a new convert to the merits of flake graphite:

LANARK, ILL., September 23, 1904.

I received samples of graphite you sent me some time ago and tried it at once on a main pin on engine I am running, that had been giving me all kinds of trouble. They say "a pleased customer is the best advertisement." Joseph Dixon's Pure Flake Graphite and I always travel together now.

I find I can run with about one-half the amount of valve oil by using a little graphite on the valves. N. B. G.

With the Illinois Central R. R.

DO NOT be set in the notion that any smear which "sets" is the proper one for pipe joints. It surely means strained muscles, broken tongs or pipe-fittings, when the joint is to be undone.

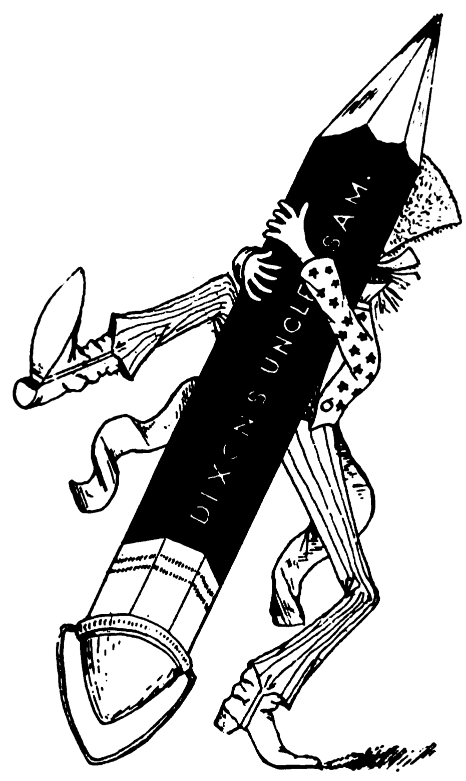
Dixon's Graphite Pipe Joint Compound will make tight joints that are easy to break, will wholly prevent rust, and cost you, first and last, much less than any other form of pipe cement.

ON PRICE CUTTING.

One of our correspondents, a bright and brainy man, who knows that what benefits one benefits all, sends in the following soliloquy on price cutting:

To cut, or not to cut, that is the question.
Whether 'tis not better in the end
To let the chap who knows not the worth
Have the work at cut-throat price, or,
To take up arms against his competition,
And, by opposing cut for cut, end it.
To cut — and by cutting put the other cutter
Out of business — 'tis a consummation
Devoutly to be wish'd. To cut — to slash —
Perchance myself to get it in the neck —
Ay, there's the rub; for when one starts
To meet the other fellow's price, 'tis like as not
He's up against it good and hard.
To cut and slash is not to end the confusion
And the many evils the trade is pestered with;
Nay, nay, Pauline; 'tis but the forerunner
Of debt and mortgage such course portends.
'Tis well to get the price the work is worth
And not be bullied into doing it
For what So-and-So will do it for.
Price-cutting doth appear unseemly
And fit only for the man who knows not
What his work is worth, and who, ere long,
By very stress of making vain comparison
'Twixt bank account and liabilities,
Will make his exit from the business.

—*The Picture and Art Trade.*



UNCLE SAM AND HIS "BIG STICK."

A DIXON PENCIL IS MIGHTIER THAN THE BIGGEST STICK.

AN ESSAY ON WATER.

A very original essay on water by a very small boy is quoted by a contemporary. He divides all water into four sub-headings—rain water, soda water, holy water and brine. "Water," he continues, "is used for a good many things. Sailors use water to go to sea on. Water is a good thing to fire at boys with a squirt gun and to catch fishes in." But the strangest of all uses for water is this: "Nobody," he says, "could be saved from drowning if there wasn't water to pull them out of." One is here reminded of a similar essay on pins, in the course of which the boy writer said that pins have saved many lives by people not swallowing them."—*Ram's Horn.*

DIXON'S GRAPHITE AXLE GREASE.

The following testimonial for Dixon's Graphite Axle Grease comes to us from Capt. Malcolm W. Jordan, of the Fire Insurance Corps, Baltimore, Md.:

"I desire to express to you an endorsement of the axle grease purchased of you some time ago.

"We have been using various kinds and brands of grease, but none of them has given the satisfaction that Dixon's has.

"On our wagons one application has lasted as long as three weeks, whereas with the others ten days was the extreme limit.

"Although costing a little more than the average grease, this is more than balanced by the length of time it lasts, and I cheerfully recommend its use to all owners of vehicles."

FUN IN THE PRESS.

A farmer had a seeder for the sowing of his seed,
'Twas a seeder made of cedar, and, said I, "Pray, is there need
Of a seeder made of cedar?" Said the farmer, "Yes indeed!
I have never seed a seeder, sir, that I'd concede the speed
To exceed a cedar seeder for the seeding of the seed."

—*Life.*

A PIPE joint compound of pure flake graphite that will never "set," that will make the tightest joints, that will resist all rust and corrosion, and guarantees an easy separation at any time for flanges or screw threads, bolts, nuts, or manhole covers.

Such is Dixon's Graphite Pipe Joint Compound. It is economical and remarkably useful.

TO THE engineer or mechanic whose ear can detect the groaning of a piston or valve, who can sense the grinding of a pin or journal or eccentric, perceive the squeak of a cutting bearing, or see the smoke from an overheated box, to such a one Dixon's Ticonderoga Flake Graphite, "the perfect lubricant," speaks eloquently of ended troubles, of reduced wear and tear and lower running costs.

A VOICE FROM ARICA, CHILE, IN PRAISE OF DIXON'S "ETERNO" PENCILS.

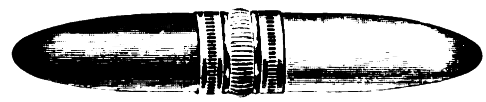
The American Consul in Arica, Chile, writes us as follows:

"I am pleased to acknowledge receipt of half a dozen Dixon's "Eterno" Pencils and thank you very much.

"I find these pencils very much to my taste, and a splendid satisfaction, after the soft, fragile leads of those pencils of other brands that are for sale by the dealers here."

A NEW ERASIVE RUBBER.

It is hard now-a-days to tell what a novelty is. We do not know as this erasive rubber can be called a novelty, but as a double ender it is a beauty, and as an effective eraser for ink



and pencil marks it is all that could be asked for. If your stationer does not happen to have any of them, or if he lives so far off that it is easier for you to send us ten cents for one, send us the ten cents and you will receive one all expenses prepaid.

EXTREMES.

The Joseph Dixon Crucible Company has its factories and headquarters at Jersey City. Its graphite mines are at Ticonderoga, N. Y., three hundred miles north, and its cedar mills at Crystal River, Fla., 1,200 miles south. As this issue of GRAPHITE was going to press, the Dixon Company received in the same mail letters from the superintendents of its graphite mines and of its cedar plant.

The superintendent of the graphite mines said: "The thermometer this morning is 10 degrees below zero and everything is frozen except our steam pump, and it is reported that about all the pumps in the village are frozen."

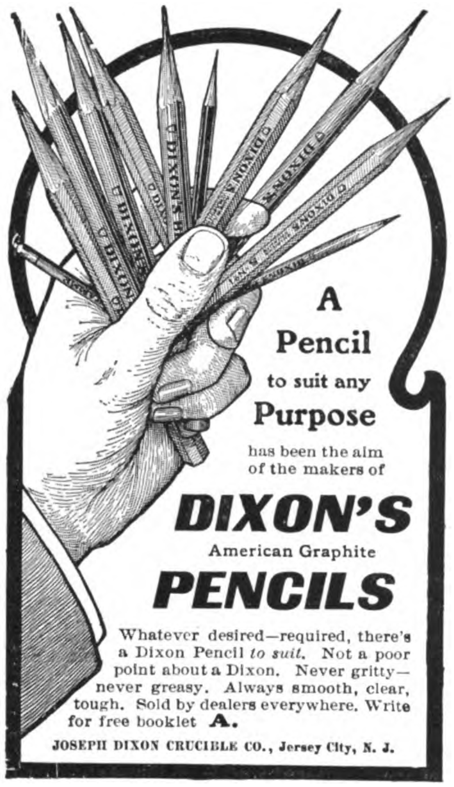
The superintendent of the cedar mill wrote as follows: "The thermometer this morning is 70; weather open, warm, balmy and generally delightful."

THE Joseph Dixon Crucible Co., Jersey City, N. J., sends us a little booklet giving some observations on the causes of the slipping of leather belting and the conditions which justify the uses of a belt dressing. Paragraphs in this little pamphlet treat of overloaded belts, dirty belts, dried out belts, and slack belts. Various dressings, such as vegetable and animal oils, resin and waterproof dressings are considered. The booklet also has something to say about Dixon's Traction Belt Dressing.—*American Artisan.*

IMPROVEMENT and progress have no place for the ancient tradition of red lead for pipe fitting. For the work it will do it costs quite a little more than Dixon's Graphite Pipe Joint Compound, and for the general smashing when joints must be separated, red lead costs many times as much.

Screw threads work easily both ways, because graphite both lubricates and tightens.

DIXON'S graphite publications are sent free of charge to all who are interested in the subject of graphite.



No. Deering, Me., Dec. 28, 1904.

Joseph Dixon Crucible Co., Jersey City, N. J.

Dear Sirs:—We are in receipt of your esteemed favor of Dec. 27, also of the sample of the Dixon Eterno Pencil. We are much pleased with the pencil. It meets our requirements in every particular and is certainly as near perfection as we think it possible to attain in a pencil of this kind. Please accept our thanks for the sample. We assure you we shall use it in our work in the future.

Yours sincerely,
(Signed), Maine Tract Society,
Per E. H. Morton,
Secretary and Treasurer.

Hartford, Conn., Sept. 20, 1094.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Gentlemen:—In reply to your favor of the 19th inst. would say, we received a sample of your axle grease some-time ago. I have given the same trial, and we are pleased to say that it is without any exception the finest lubricant we have ever used on our wagons, and shall continue to use it in preference to any other.

We are not in the market for any at present, but when we are you will surely receive our orders.

Thanking you for the sample we remain,

Yours truly,
———

Times without number, Dixon's Pure Flake Graphite has proved the cure-all in friction emergencies.

If used sparingly and often, emergencies won't arise and the friction load will be greatly reduced.

To anyone who realizes the value of reducing friction troubles, we will gladly send pamphlet on the subject of graphite and lubrication.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, type-writer work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Products for Electricians.

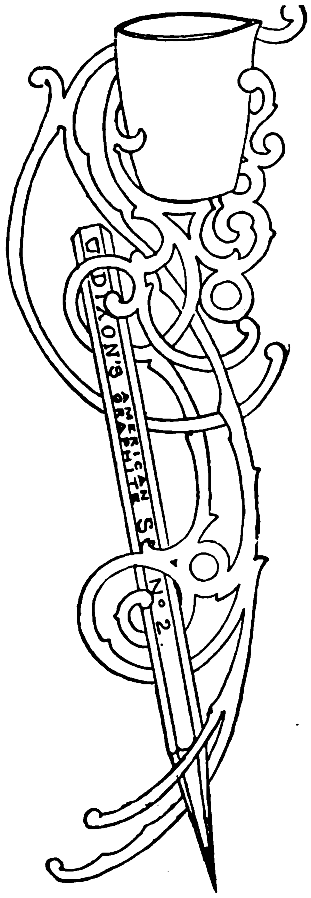
Special circulars with detailed information sent on request.

Graphite

Vol. VII. APRIL, 1905. No. 4.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

COPY FREE ON REQUEST.



A GOOD OLD PAINT.

The perfection of pigments and oil is found in Dixon's Silica-Graphite Paint.

Every package represents the highest standard of quality in boiled linseed oil, which is ground and mixed in correct proportions with Dixon's Ticonderoga Flake Graphite and Silica.

These mineral pigments are mined and milled under the direction of a skilled mineralogist. The grinding and mixing is under the supervision of a mechanical engineer who has spent years in the study and tests of pigments and paints.

The boiled linseed oil is purchased of manufacturers guaranteeing it to be strictly pure old process oil, and thoroughly filtered and aged before shipment to us. This oil is subjected to the examination and approval of our chemist before it is used in the making of Dixon's Silica-Graphite Paint.

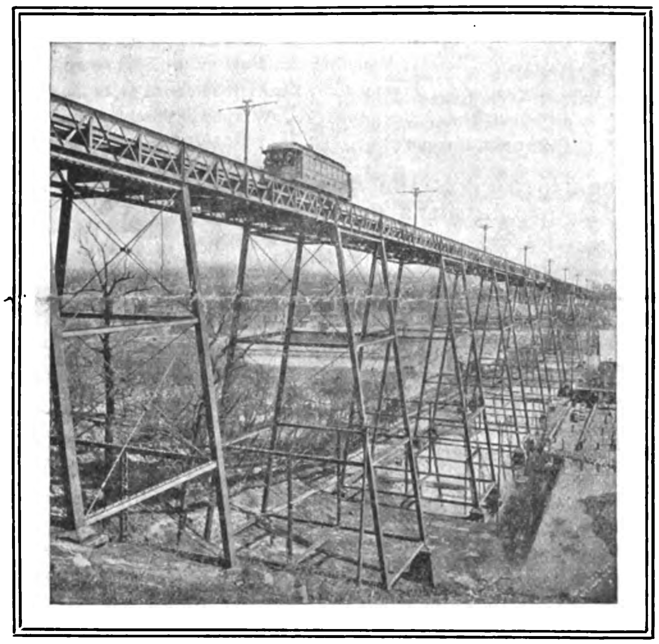
Every feature in the making of this paint is so carefully directed that the purchaser gets the perfection of mixture and quality.

Practically every city in the world has structures of some class or other that are painted with Dixon's Silica-Graphite Paint.

Your neighbor has possibly used Dixon's Silica-Graphite Paint. Write us and we can tell you who has used it in your neighborhood, and the paint will testify as to its ability to withstand the climate.

THE BUILDING OF KING SOLOMON'S TEMPLE.

Even in these days of extravagance and millionaire display, very few people have any adequate impression of the immense cost of the great temple of Solomon at Jerusalem, the site of which is undoubtedly occupied by the splendid Mosque of Omar, a Saracenic building of exquisite beauty, of octagonial form and of great height, surmounted by a dome. It is built of marble and is of a pale blue color, the platform on which it stands being of a dazzling white. In the building of Solomon's Temple the preparation of the materials, the cost of labor, etc., the cost was really wonderful. For example, there were 80,000 men employed as hewers of stone, 60,000 bearers of burdens, 10,000 hewers of cedars, 3,300 overseers, all of whom were employed for seven years, and upon whom, besides their wages, Solomon bestowed £8,773,970. If their daily food was worth 2s. each, the total sum for all was £63,877,088 during the time of building. The materials in the rough are estimated as having been worth £2,545,377,000, and the total cost of the building is placed at the enormous sum of £6,879,822,000 sterling.—*Record and Guide.*



STREET CAR ELEVATED STRUCTURE.

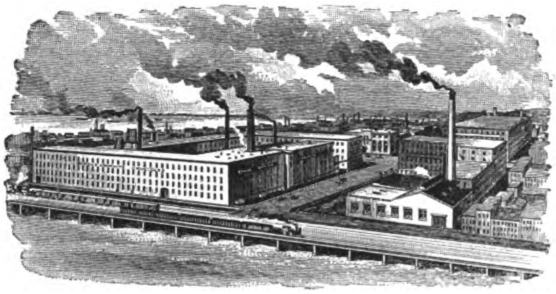
Hoboken, N. J.

The two-track steel elevated structure of the Public Service Co. extends from the Delaware, Lackawanna & Western Passenger Terminal, Hoboken, to Hoboken Heights, a distance of a mile.

Lead and oil paint failed to protect this structure from rust, and the steel was in a very badly corroded condition in the fall of 1899, when the street railway officials directed that the entire structure be thoroughly cleaned of rust and blistered paint, and given two coats of Dixon's Silica-Graphite Paint.

Dixon's Natural Color was used for priming coat and Dixon's Dark Red for finishing coat. The two coats of Dixon's Silica-Graphite Paint stopped initial corrosion and have protected this structure from rust for over five years without the necessity of repainting.

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Cophenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* **JOHN A. WALKER,** *Vice Pres. and Treas.* **GEO. E. LONG,** *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., April, 1905.

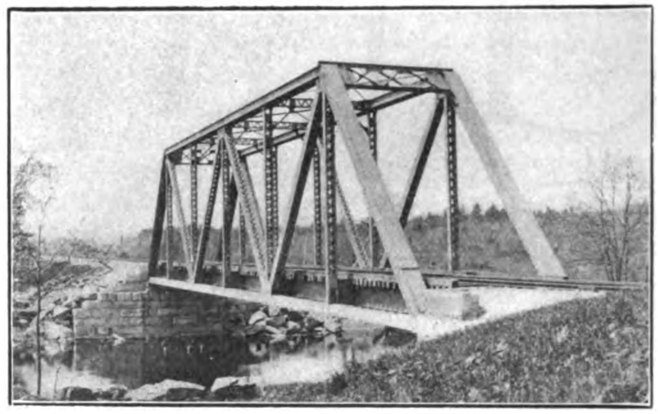
OUR PRIDE IN MAKING AND SELLING.

The very highest grade of protective paint for steel work and metal surfaces is well told in the columns of GRAPHITE this month. For many years we have resisted the demands of some branches of the paint trade for a second quality in Dixon's Silica-Graphite Paint. In the past, as in the present and for the future, Dixon's Silica-Graphite Paint will be made in but the *one quality*, of correct proportions of best pigments and oil.

MANUFACTURERS IN GLASS BUILDINGS.

Manufacturers of carbon and graphite paints should not throw stones at an old and successful product like Dixon's Silica-Graphite Paint. Success brings competitors, and each manufacturer should make fair statements as to the superiority of his preservative coating, and to each will come the success that is deserved.

The success of Dixon's Silica-Graphite Paint has brought a great many youngsters, whose manufacturers devote pages in their attractive little books, to throwing stones at Dixon's Ticonderoga Flake Graphite and Silica as paint pigments. For forty-one years Dixon's pigments have been doing excellent work, as thousands of users can testify.



LITTLE ANDROSCOGGIN BRIDGE.

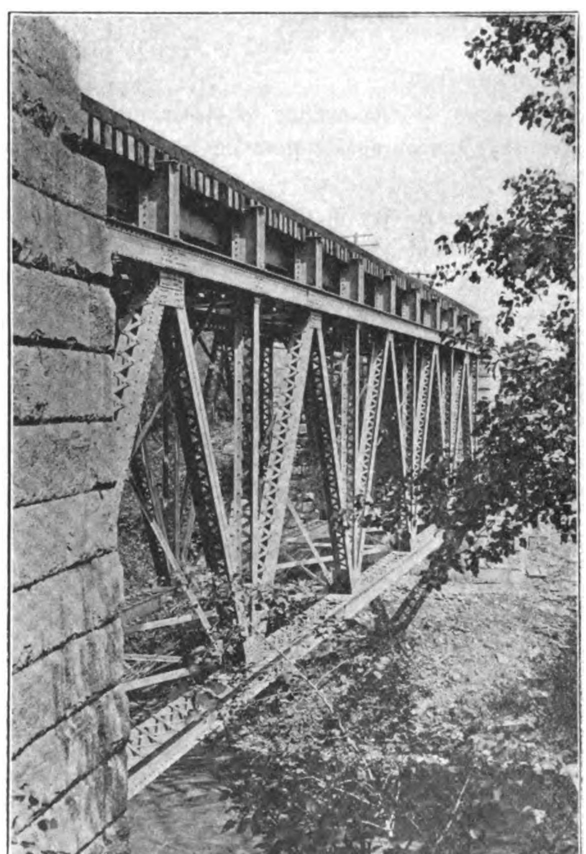
MAINE CENTRAL RAILROAD BRIDGES.

The accompanying illustrations of Maine Central Railroad bridges show the Little Androscoggin Bridge near Auburn, Me., and the Rice Bridge, near Oakland, Me.

The Maine Central Railroad Company is building its bridges on the most approved lines and the material is of the highest grades, great care being given to all details.

The bridges were designed and constructed under the direction of the Engineering Department of the Maine Central Railroad, Mr. T. L. Dunn, Chief Engineer, Mr. B. W. Guppy, Bridge Engineer. Mr. P. N. Watson, Supervisor of Bridges and Buildings, was in charge of the erection.

These bridges are protected from corrosion by a priming coat of Dixon's Silica-Graphite Paint.



RICE BRIDGE.

Northwest Section — JOHN WANAMAKER STORE — Philadelphia.

D. H. BURNHAM & CO., Architects. | **WM. C. HADDOCK, Engineer of Construction.** | **THOMPSON-STARRETT CO., Contractors.**

On the right appears a suggestion of the ornamental detail of the magnificent City Hall, Philadelphia, and opposite is the first of the four sections of the John Wanamaker store, now building on the block bounded by Market, Juniper, Chestnut and Thirteenth streets.

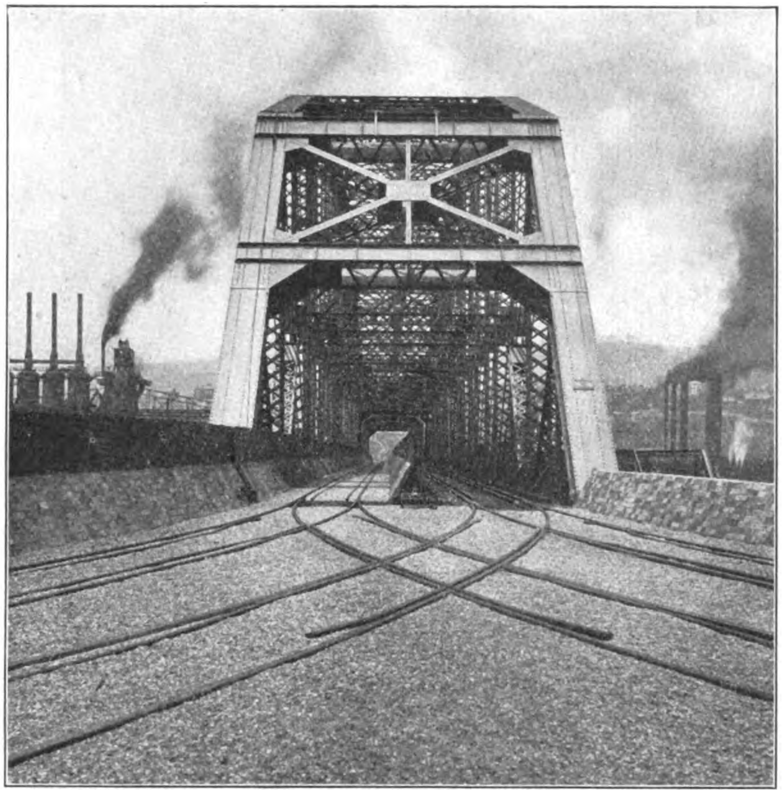
John Wanamaker's new store will be the largest fireproof building ever erected under one roof, and will contain approximately 1,600,000 square feet of floor and roof area, on a site 246 x 476 feet, with twelve main floors and three mezzanine floors above the street level, and two main floors and a mezzanine floor below ground.

The elegant fixtures and floor arrangements provide the most perfect facilities for shopping to be found in the entire world.

The best building materials are being selected and used. The high standard of quality maintained for Dixon's Silica-Graphite Paint, with its proven protective qualities, procured its use for the 26,000 tons of steel that will be contained in this mammoth building.

The American Bridge Company are supplying the structural steel, to which they apply Dixon's Natural Color at the mill.

The Thompson-Starrett Company, general contractors for the entire building, are erecting the steel work and applying Dixon's Dark Red for the field coat.



THE RANKIN BRIDGE — UNION RAILROAD, PITTSBURGH, PA.

This bridge is familiarly known to Pittsburghers as the "Hot Metal Bridge." Painted during the winter of 1900 and 1901, with two coats of Dixon's Silica-Graphite Paint, the necessity of repainting since has been obviated by the ability of this paint to withstand the heat and gases from the molten metal, sulphurous fumes from shifting engines, river craft, furnaces and steel mills nearby, and general climatic conditions.

DIXON'S PAINT ON WOOD-WORK.

By H. A. Nealley, Boston, Mass.

The excellent qualities of Dixon's Silica-Graphite Paint as a protective coating for iron and steel are widely known throughout the world. Comparatively few, however, are acquainted with the advantages this paint possesses over all others for exterior wood-work, factory buildings, city and country houses, fences and shingle roofs. For such work Dixon's Dark Red, Olive Green and Natural Color are highly recommended.

While giving the artistic effect characteristic of the best stains, Dixon's colors are far more durable. Four years ago the pumping station and ice house at MacMahan Island, on the Maine coast, were painted with Dixon's Olive Green.

Despite severe atmospheric conditions which exist near the sea, a recent careful examination showed the paint to be in perfect condition, in fact it looks better than when applied. The famous Ticonderoga Flake Graphite in the pigment has, so to speak, asserted itself producing a soft, rich hue in perfect harmony with the foliage and moss-covered rocks in which the blending of colors is one of Nature's secrets.

A year ago a new cottage with old-fashioned gable roofs and shingles was painted with Dixon's Olive Green. This paint was used on roofs, window sashes, in fact on every inch of exterior surface with the exception of piazza floor. One coat was all that was necessary to perfectly cover the new wood. Compared with other cottages on the island, which are stained, the cottage painted with Dixon's Green is considered the most artistic.

Three important points were gained by using the Dixon colors: first, ecomony in point of first cost, on account of good covering power and ease of application; second, excellent durability, preventing the expense of frequent repainting; third, artistic effects.

This cottage attracted the attention of Rev. Mr. Page of Chicago, and he has specified Dixon's Silica-Graphite Paint for his cottage, which will be completed at MacMahan this year.

A pleasing combination of colors can be obtained by using Dixon's Green and Dixon's Dark Red on the body of the house, applying a lighter paint to the window sashes and trimmings.

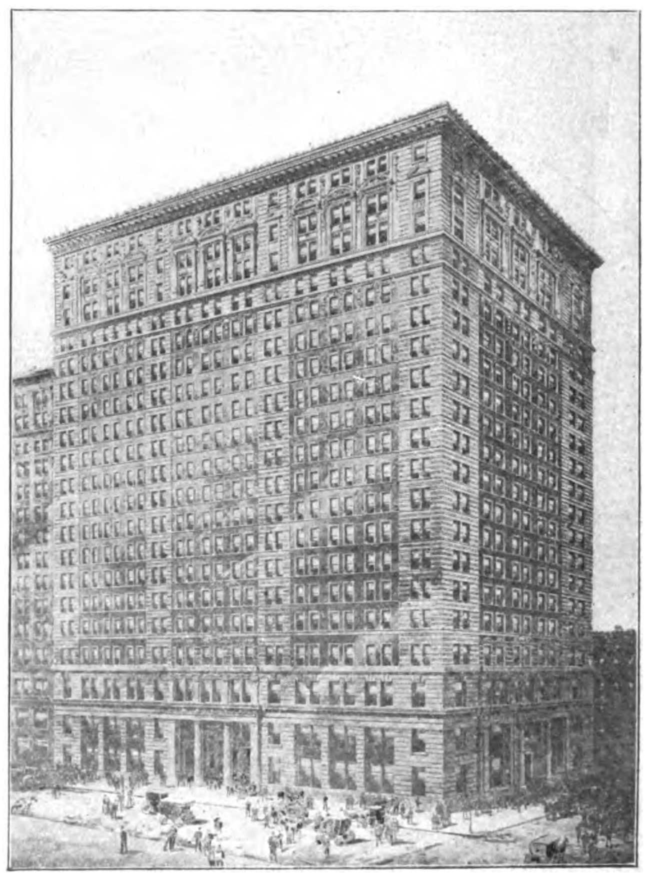
BROAD EXCHANGE BUILDING, NEW YORK CITY.

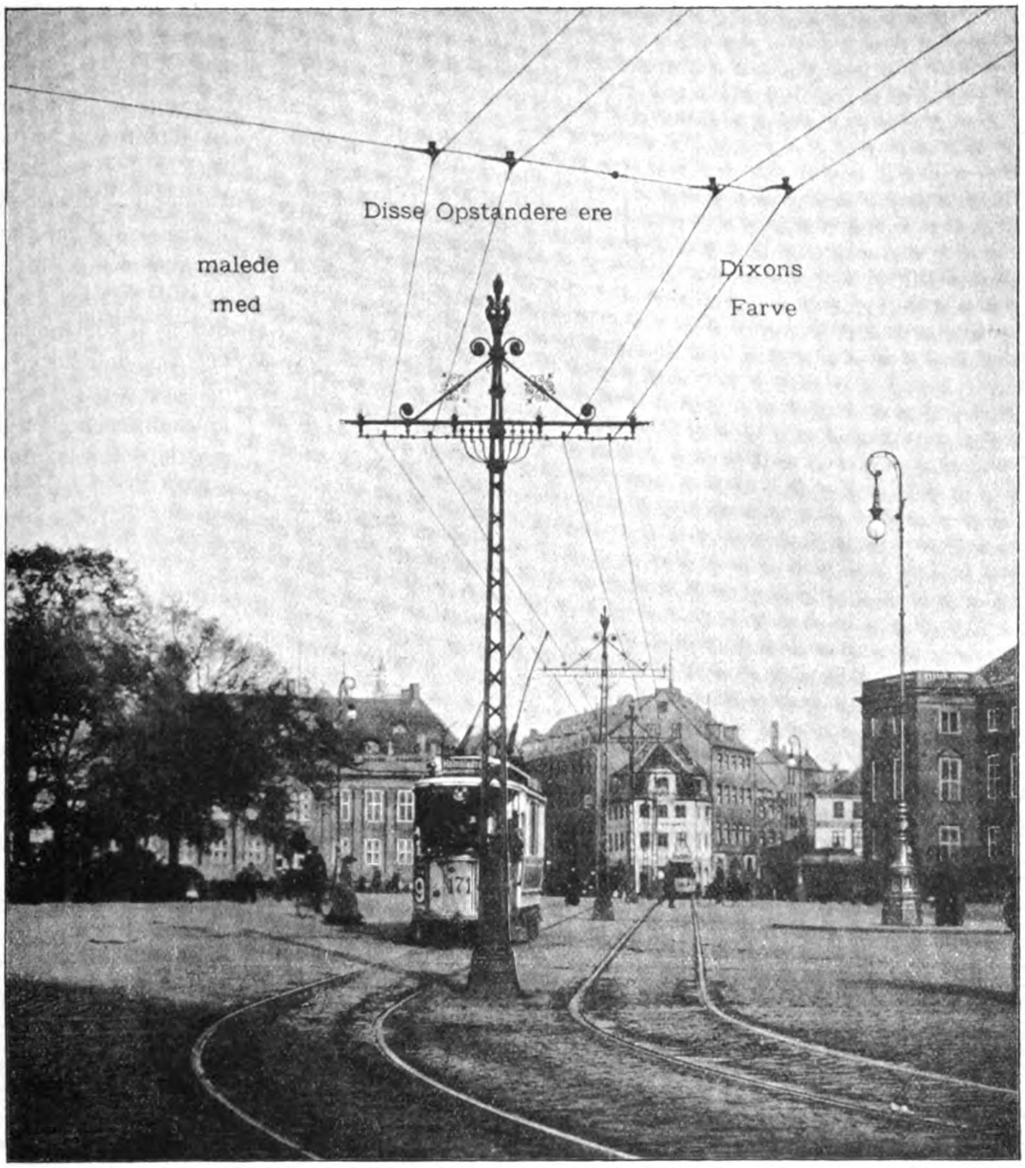
The Largest Office Building in Point of Floor Area in the Entire World.

CLINTON & RUSSELL, Architects.
GEO. A. FULLER CO., Builders.

Architects Clinton & Russell selected Dixon's Silica-Graphite Paint to be used for the preservation of all structural steel work contained in this magnificent building.

The Carnegie Steel Co. applied the shop coat and the Geo. A. Fuller Co. the field coat of Dixon's Silica-Graphite Paint.





COPENHAGEN, DENMARK.

Dixon's Silica-Graphite Paint is making records of durability at home and abroad. Mr. Gustav Halberstadt of Copenhagen, Denmark, has actively furthered the use of this paint in Denmark by sending to specifiers and users of protective paint unique and attractive advertisements telling of the good qualities of Dixon's Silica-Graphite Paint.

Mr. Halberstadt, in an interesting letter under date of January 24th, writes as follows:

"It is now three years since I introduced your paint here, and I have especially to thank Mr. Irminger, the director of one of the gas works, who had tried Dixon's Black on some cisterns which contained air of a very high temperature. Mr. Irminger was very well satisfied with the result, and later on used Dixon's Paint for the gas receiver of the works. Mr. Edwards, director of the Danish Gas Co., has also used your Graphite Paint, with satisfaction, on large gas reservoirs.

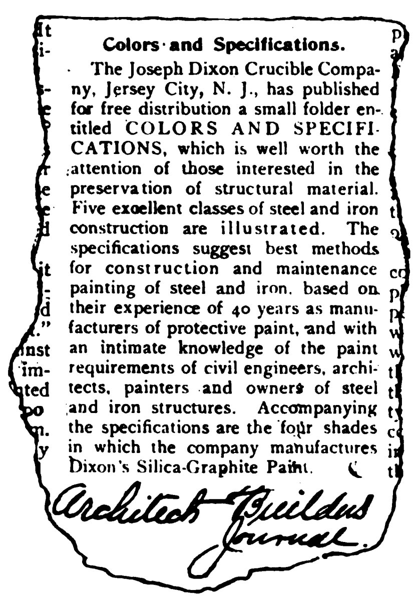
"One year after, during the Technical-Hygienic Congress, the government made some experiments with different paints, and on this occasion the result was, as I have mentioned heretofore, that Dixon's Paint was much better than red lead. The plates which were painted were exposed to the gas from a large boiler, and red lead was destroyed after a few days, and Dixon's Paint only after 120 days.

"After this I introduced your paint to the electrical railways, and the manager, Mr. Faber, and his engineers tried it on different places, until they now use it to a very large extent on all of their trolley standards, as you will see from the photograph of the street scene in Copenhagen.

"I am very glad to introduce your graphite products, although it has taken much time; but this is not only the case with yours but with all new articles here which first shall show their superiority; then people will use them to a large extent."

WORK A BLESSED PRIVILEGE.

Once we thought work was a curse; then it came to us that it was a necessary evil; and yesterday the truth dawned upon us that work is a blessed privilege.—*The Philistine.*


Colors and Specifications.

The Joseph Dixon Crucible Company, Jersey City, N. J., has published for free distribution a small folder entitled COLORS AND SPECIFICATIONS, which is well worth the attention of those interested in the preservation of structural material. Five excellent classes of steel and iron construction are illustrated. The specifications suggest best methods for construction and maintenance painting of steel and iron, based on their experience of 40 years as manufacturers of protective paint, and with an intimate knowledge of the paint requirements of civil engineers, architects, painters and owners of steel and iron structures. Accompanying the specifications are the four shades in which the company manufactures Dixon's Silica-Graphite Paint.

Architect Builders Journal

THE BROADWAY TABERNACLE, NEW YORK CITY.

BARNEY & CHAPMAN, Architects.

The Broadway Tabernacle is one of the oldest church organizations of New York, and of the Congregational denomination. Fifty years ago it was on Broadway near Leonard Street, and later at the corner of Broadway and 34th Street. This corner being of great business value, it was sold very advantageously, and the new Tabernacle as shown in our illustration, is now being completed at Broadway and 56th Street. We are indebted to the *Fireproof Magazine* for the loan of this excellent half-tone.

Religious denominations and architects will be interested in the following statement by Messrs. Barney & Chapman, as to the design and accommodations of the Broadway Tabernacle:

"The peculiarity of the problem is the treating of the church, and the building containing the different offices to be used for the church work in such a way as to make a harmonious whole, thoroughly ecclesiastical, both in feeling and design. On a very limited amount of ground, peculiar in shape, had to be accommodated an audience of fifteen hundred in the main auditorium, an audience of six hundred in the lecture hall, an audience of three hundred and fifty in the small chapel, and an audience of fifty in a still smaller chapel; Sunday-school rooms to accommodate thirty-two classes, with a central assembly room, in which all the classes are to meet; accommodations for the different offices in connection with the women's mission work, men's mission work, temperance societies, club rooms, library, etc., accommodations for all the working departments of the church, minister's study, and rooms for the different assistants, etc., etc.

"This rendered necessary, besides the main auditorium, a building which is practically a ten-story office building, which, coming under the laws of such buildings in the city, it was necessary to make fireproof, and, being in such close connection with the church proper, it was deemed advisable to make that also fireproof.

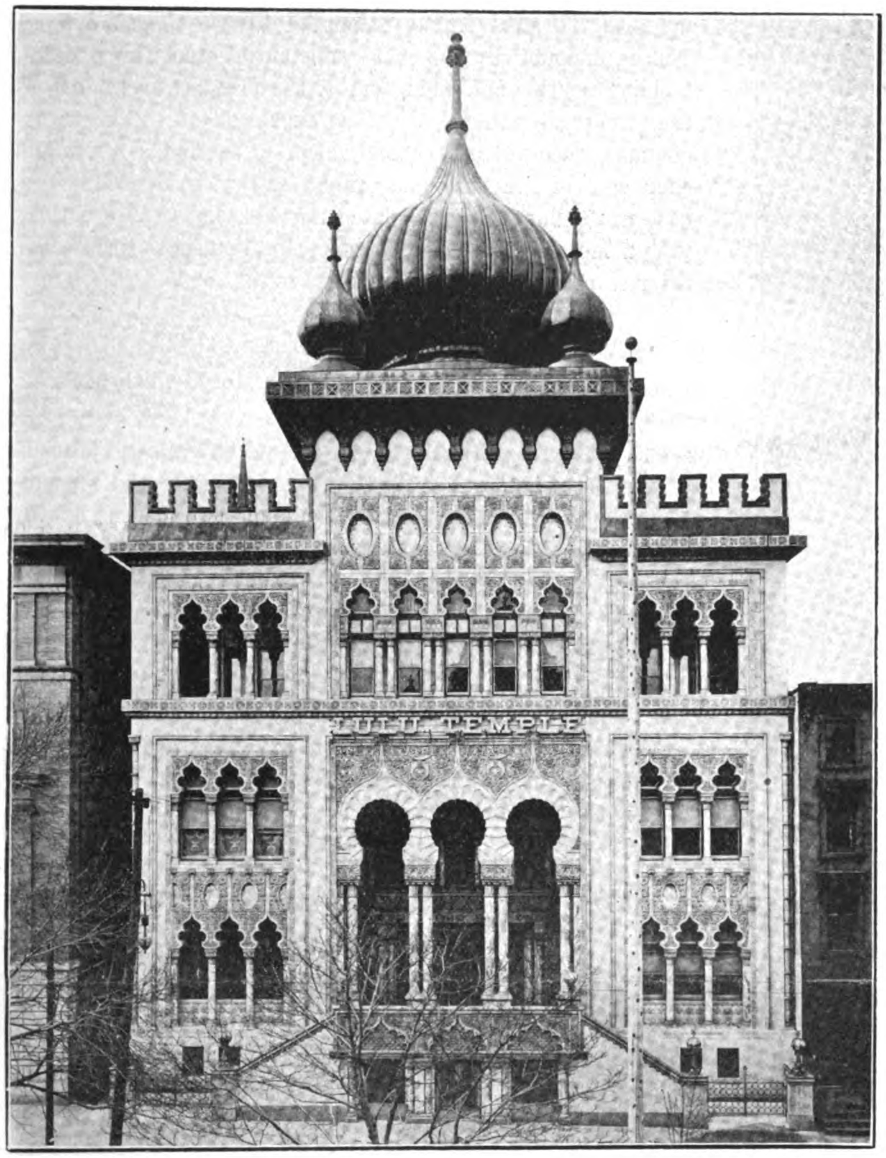
"As to whether or not we have successfully solved this most difficult problem from an aesthetic standpoint, we are willing to abide by the decision of critics competent to judge. We claim, however, that the solution was not due to a striving after originality and novelty, but is the exact expression of the requirements."

Under the direction of Barney & Chapman, Architects, the Brown-Ketcham Iron Works used Dixon's Silica-Graphite Paint, Natural and Dark Red Colors, to preserve the structural steel work from corrosion.

The quality and good coatings given by Dixon's Silica-Graphite Paint make it popular with architects and steel contractors.

PASSING THOUGHTS.

There is so much bad in the best of us,
And so much good in the worst of us,
That it hardly behooves any one of us
To talk about the rest of us.



LU LU TEMPLE,

Spring-Garden and Broad Streets, Philadelphia.

MILLIGAN & WEBBER, Architects.

This attractive Temple in Bassintine architecture and Spanish Alhambra details, has received the plaudits of the architectural profession and the Ancient Arabic Order Nobles Mystic Shrine. The owners, Imperial Council, A. A. O. N. M. S., Philadelphia, take pardonable pride in displaying the unexcelled beauties and conveniences of Lu Lu Temple to visiting Shriners.

The finish of the exterior is terra cotta, white brick, Georgia marble columns and copper domes. In the basement are well appointed smoking rooms, billiard room, novices' room, kitchen and power plant. The first floor provides an immense dining hall and two large reception parlors. On the second floor is the Shrine Hall with galleries around each side, with a capacity for 2,000 persons. The organ loft, band balcony and patrol room occupies the third floor. The interior decorations are rich and appropriate to the organization.

Dixon's Silica-Graphite Paint was used to preserve the structural steel work. Milligan & Webber, the architects, entrusted the building of the Temple to one of Philadelphia's best builders, Mr. Joseph Bird.

SPRING, 1905.

PAINT SUGGESTIONS.

After the snow and ice, that have been so plentiful, have melted from the steel structures and metal roofs, it is time to repair the damage done to the metallic surfaces and to the old preservative coating.

Mother Earth, each spring, renews her coatings of grass, leaves and flowers. This spring emulate wise old Mother Earth and renew the preservative and decorative coatings of your bridges, fences and buildings with Dixon's Silica-Graphite Paint. It is a good purchase, as the use of this paint will save your structures from destruction, and its fine appearance increases the value of your possessions. It is an economical paint to use, as it spreads on smoothly and covers from 500 to 550 square feet to the gallon for a good coating.

Dixon's Silica-Graphite Paint is unlike the grass, leaves and flowers; it does not have to be renewed each spring. The four Dixon colors retain practically their original shades during their long protective life. Insist upon Dixon's Silica-Graphite Paint being delivered to you in the original packages. Provide in your painting contract that thinners and dryers are not to be used. That all rust, blistered and cracked paint and dirt shall be thoroughly removed. That these broken places in the old coating shall, the same day they are cleaned, be covered with Dixon's Paint. After the touched-up places are properly dried, the entire surface is to have an evenly-brushed on priming coat of Dixon's Silica-Graphite Paint, color as selected. This coat having been allowed to dry for three or four weeks, a finishing coat of Dixon's Silica-Graphite Paint shall be evenly brushed on, color as selected.

The priming and finishing coats should be of a different color, to facilitate inspection and insure the proper use of two coats of paint. All painting to be done on dry surfaces. Painted in this manner, your structures will be well protected from the weakening effects of rust.

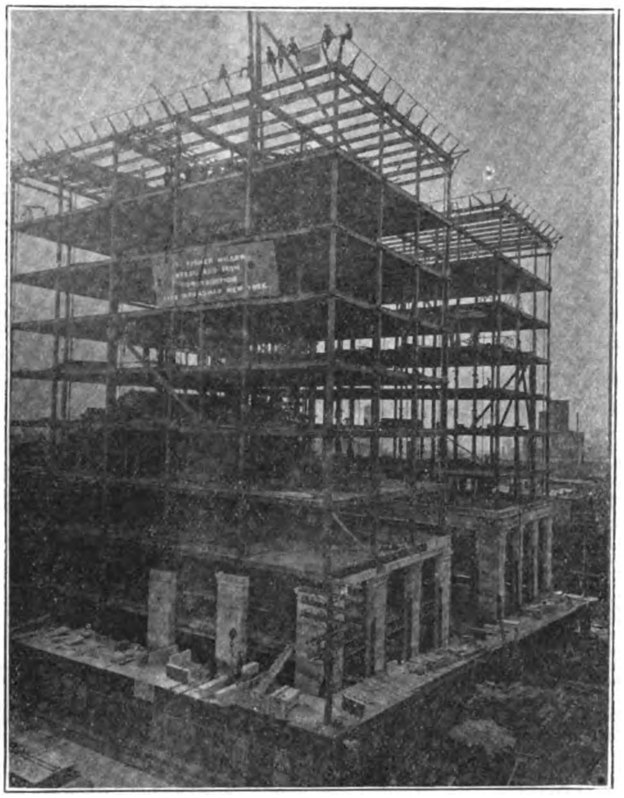
These suggestions are based on the best practice for best results in renewing paint coatings.

Secure a copy of "Colors and Specifications," showing the four Dixon's colors, with practical specifications for construction and maintenance painting.

DIVIDING TIME.

A New England boy was presented with a new express wagon, which he promised to share with his little cousin, each to have the wagon half the time.

On noticing the little cousin going home in tears, the mother of the young wagon owner asked her son why he did not divide the time evenly. "Oh, I have," he replied, "I am going to play with the wagon day times and he can have it nights."



THE MUTUAL ASSURANCE SOCIETY OF VIRGINIA, RICHMOND, VA.

The cut shows the structural steel work and complete frame for the new Mutual Assurance Society building now being erected from the plans and specifications of Messrs. Clinton & Russell, Architects, of New York. There are nine stories, basement, and sub-basement, and the building occupies a plot 105 × 155.

The frame work at the present time stops at the ninth floor, but the steel work is designed to support three additional stories, which can be put on at any time. The character of the frame is of the most substantial workmanship, due attention being given to wind pressure, and the concentration of heavy safes and vaults throughout the building.

The plot of ground permits of the use of cast iron columns, the building having so large a base area in proportion to its height. The structural steel work was incorporated into the foundations, there being something like 400 tons of riveted work in this portion of the building, erected as fast as the difficult foundations would permit, the sub-basement being two stories below the street. This work, together with the steel retaining wall material, occupied something like six weeks for installation.

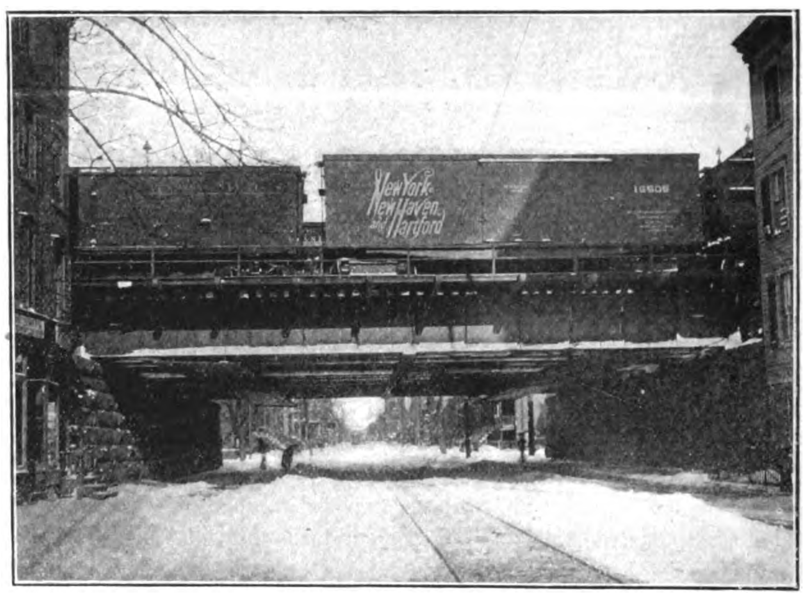
The sub-basement columns and floor system work was under way by June 10th, 1904, and the roof completely finished by the first week in September. This was very rapid construction, for the South, and the erection of the steel work was a source of constant interest to the sight-seeing public, who stood in the streets, watching the active bridgemen at their duties.

The structural tonnage, including the castings which went up with the steel frame, amounted to two thousand tons. This is undoubtedly the most substantial steel frame office building south of Washington, at the present time. All of the structural material, with the exception of the cast-iron columns, received at the mill, after inspection, a thorough shop coat of Dixon's Silica-Graphite Paint, Dark Red. The cast iron columns were painted immediately after erection, with a thorough coat of the same paint, and the entire frame, after erection, was given a second coat in the field, of Dixon's Olive Green.

The exterior of the building is faced entirely with limestone, with the exception of the upper story, which is faced with terra cotta.

The Mutual Assurance Society will occupy a large portion of the second floor for its own offices, and at the present time, with the completion of the building two months hence, practically 75 per cent. of the entire number of offices are rented. . The character of this building and the earning capacity, will undoubtedly produce a call for buildings of a similar character in Richmond.

The structural steel work and the ornamental iron work was furnished and erected by S. Fischer Miller, 1133 Broadway, New York City, Contractor for Steel and Iron Construction; the ornamental iron work was sub-let by Mr. Miller to the L. Schreiber & Sons Co., of Cincinnati, Ohio.



SNOW, RAIN AND HEAT OF THE SUN.

Our readers in tropical climates will be interested in the illustration of the Pennsylvania Railroad freight elevation, Sixth and Erie streets, Jersey City. A heavy drifting snow storm during the night, with sleet in the morning, and the sun shining brightly at noon, gives the weather conditions obtaining on the day this photograph was made.

Steel girder bridges carrying heavy freight loads over city streets, must have the steel work well protected from the weakening effects of rust.

Dixon's Silica-Graphite Paint is retaining the strength of this structure by its ability to withstand for a long time the severe climatic conditions of the New York harbor.

A WINTER TRIP TO EUROPE.

I went in a jiff and returned in a jiff. It was a matter of cabling and we were on the steamer. We left New York on a certain Tuesday morning and took luncheon with the Dixon London representative on the following Monday.

One can never fail to appreciate the steamer trip, for it is a six days' experience in a new and peculiar world—a world entirely of its own. Your fellow-passengers are sure, almost to a man, to have crossed the ocean over and over again. One at my table was on his sixty-fifth crossing and another on his twenty-third passage, and so you are for six days among a coterie of travellers. Again, you find yourself in the society, for these five or six days, of unusually clever, bright and well-informed people. Dull people do not gravitate to the experience of a winter trip to London.

The steamer is a first-class hotel afloat. You have your room, your bath, your seat at the table, and hotel life goes on before your eyes. You take your coffee, after dinner, in the smoking room, with all the buzz and life of the Waldorf-Astoria or the Delmonico Cafe. Nevertheless, the steamer day is long and a trifle monotonous. The occupations and the amusements are few, and they amount to cards, shuffleboard, ringtoss, reading and with the excitement, every night, of the pool auction which always draws a full house.

London I found, as usual for the season, enveloped night and day in a thick fog, while Paris was blooming in the tempered winter sun. The big city in a fog is a curious sight. Big buildings peer out of semi-obscurity; the lights are all on at mid-day and look like dim tapers. Street traffic comes seemingly from nowhere and goes nowhere, disappears and sometimes one side of the street is hidden from the other side.

We were occupied in the law courts—the Court of Chancery at Lincoln Inn Fields—approached by Chancery Lane, and saw court life at its busiest. Our suit was a plea for justice, and one that took up several days in the trial and interested many. The gowned and wigged Justice and gowned and wigged barristers; the King's Counsel; the wool and silk; all became a never-to-be-forgotten part of one's daily life for a week. The tone of the court was high; its atmosphere impressive; the counsel talented; the examinations and cross-examinations of witnesses brilliant and instructive; while from the Judge there radiated, until it filled the room every day, the sphere of justice; it could be felt.

The odd hours not used in the preparation for the court room were spent on the London sights. One afternoon we were invited to five o'clock tea at the celebrated Whistler House, from its color called the White House. It was full of interesting objects gathered in the quest of a lifetime. Again we saw the coronation picture by our countryman, the artist Abbey; it is a marvelous bit of portraiture and color. Again we saw Shakespeare's "Tempest" by Beerbohm Tree, and will anyone that saw it ever forget the form and figure of "Caliban," as the curtain came down, when the united crowd left the island and sailed away?

Two days in Paris must not be forgotten. The court adjourned for several days and we fled to the gay city to transact our business there. It was sunshiny, crisp and cool. We stopped at the Grand Hotel, lunched at Marguery's, bought some nick-nacks at the Bon Marche, dined one evening at around-the-corner French restaurant (known only to habitues of the city), crossed the Alexandria Bridge, took a half-hour walk through the Rue de Rivoli, peeked in to the Madelaine, passed the Louvre, regretting that time forbade entrance. The gay boulevards, incomparable Avenue de l'Opera, Place de la Concorde, the gay shops, the friends visited, lunched with, the old acquaintanceship renewed, made the two days there notable ones—real experiences. One of our party was new to Paris; it was his first visit and he separated and went by himself with carriage and guide and saw everything, while we fixed up once more our business lines.

The last day in court at London was a memorable one. Our plea in the court of justice was heard and regarded and we went home happy. Then came another week of steamer life. The winds blew and the waves rolled nearly mountain high, but we are good sailors and the daily steamer life was not interrupted. The morning bath, breakfast, the outdoor walk on deck, card playing, shuffleboard, ringtoss, new acquaintances made and again New York Harbor.

We came home happy; we got what we went for and successs breeds content. Every experience is remembered. When the waves were highest we walked the proudest, until one Saturday afternoon we went down the gang-plank and were surrounded on the pier with the family and lots of friends. It was a pleasant journey, full of new and vivid experiences.

John A. Walker
Vice President

THE MAN WITH THE BRUSH.

From Timanthes (*a*) to Apelles, (*b*)
And in Zeuxis' (*c*) grapes of dream;
Painters always strove with poets,
That "things are just what they seem." (*d*)

Why be pessimistic, poet!
If appearances shall smile,
Character shall due monition
Take, and stronger grow the while.

So my lay is panegyric,
Not of poets' gardens lush;
But the brightening of the world's face,
By the men who ply the brush.

—LUCY M. STOCKING.

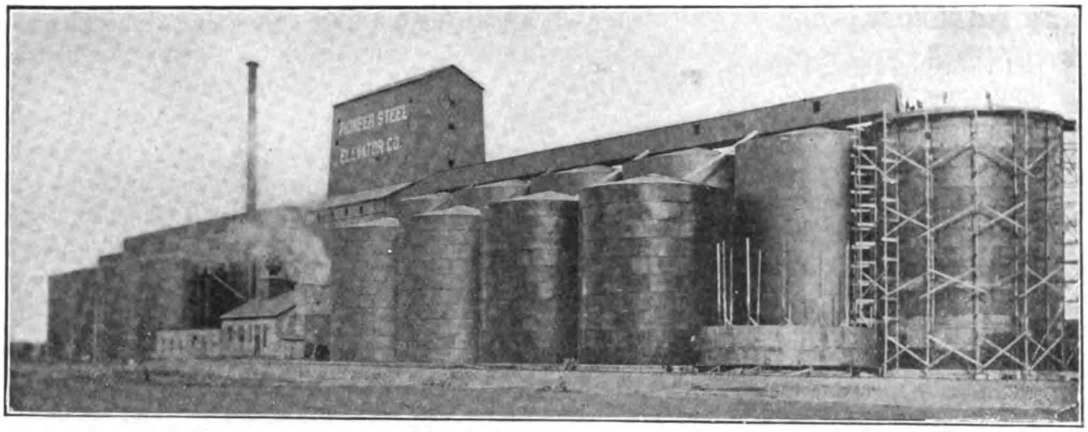
(EDITOR'S NOTE).

(*a*). A Greek tragic painter of the fourth century B. C.

(*b*). The greatest of Greek portrait painters, time of Alexander the Great. (350 B. C.)

(*c*). A celebrated Greek painter of Ephesus, 400 B. C. He is famous for the competition in which he painted a bough of grapes so realistically that the birds are said to have flown to eat them.

(*d*). "Things are not what they seem."—Longfellow's "Psalm of Life."



The Patient:
Structural Steel.

The Disease:
Rust.

The Doctors:
Paint and Brush.

The Prescription:
Dixon's Paint.

The Result:
Prolonged Life.

PIONEER STEEL ELEVATOR COMPANY,

(VAN DUSEN & HARRINGTON SYSTEM),

MINNEAPOLIS, MINN.

The great cereal warehouses of the West are built principally of steel and brick with corrugated iron sides, so as to insure, as far as possible, the safety of the grain from detruction by fire.

Situated usually along the water front, these structures are fully exposed to moisture from the river or lake, and this causes the rapid corrosion of the steel and iron work. The sulphurous fumes from steamers and harbor tugs and from the shifting engines of the railroads entering into and alongside of the elevator buildings furnishes an additional corrosive agency.

A serviceable paint is required, and the extensive use of Dixon's Silica-Graphite Paint by the large elevator companies of the West, indicates that it is the most efficient coating that can be used for iron work of elevators.

Dixon's Natural Color protects the main building and bins of the Pioneer Steel Elevator Company and will be used on the four bins now under construction.

REPUTATION.

Getting famous is not by any means so arduous a task as staying so.

Dixon's Silica-Graphite Paint became famous forty-one years ago, and during this long time it has maintained an enviable reputation.

Its fame is world-wide as a protector of steel work and metal surfaces.

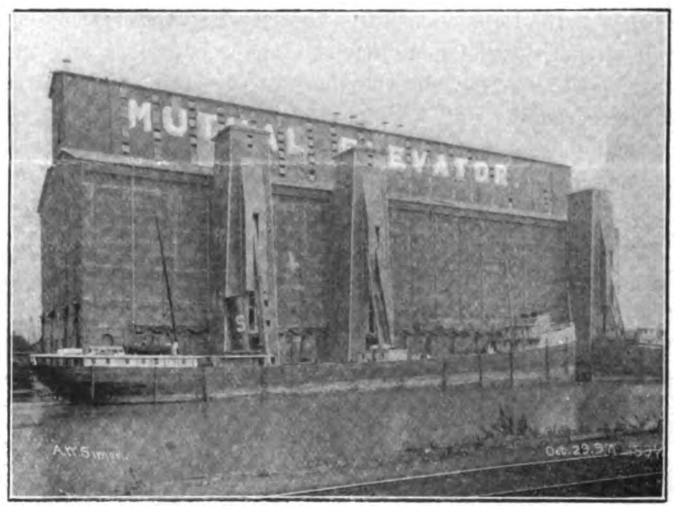
DIXON'S BLACK IN LONDON.

4th February, 1905.
140 Harley Street, W.,

Joseph Dixon Crucible Co., 26 Victoria Street, London.

Dear Sirs:—It may interest you to know that I painted the boiler and furnace door of my steam yacht "Gazelle" with your Graphite Paint, and that it lasted two seasons without touching. We steamed some 7,000 knots.

Yours faithfully,
(Signed) Charles Baly.



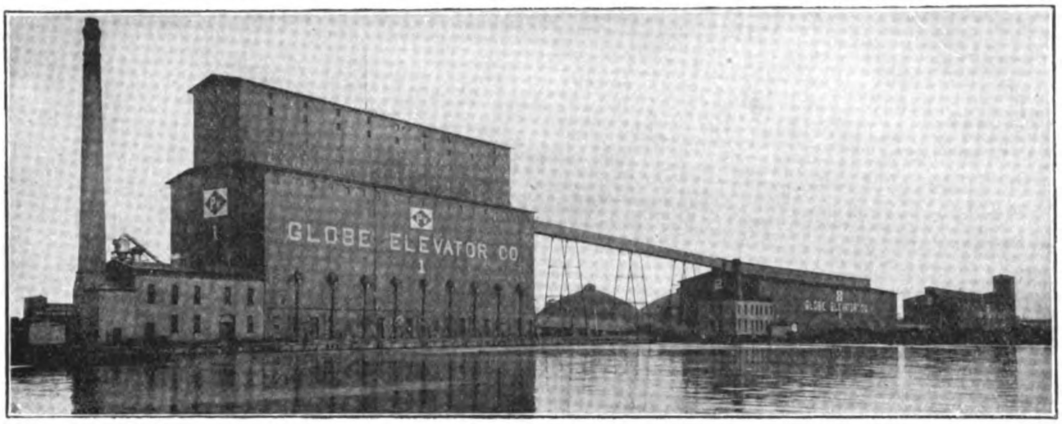
MUTUAL ELEVATOR COMPANY, BUFFALO, N. Y.

W. B. Gregory, Elevator Agent, states that the Mutual Elevator was built in 1897 for the Great Northern Elevator Company, and is located on the Blackwell Canal, on the line of the Buffalo Creek Railroad, which connects with all railroads entering Buffalo.

The elevator has a storage capacity of 2,500,000 bushels, and can elevate from vessels 30,000 bushels of grain per hour, including all shifts and clean-ups.

Its facilities allow of loading fifteen freight cars per hour, and also loading 15,000 bushels per hour into canal boats, while unloading the grain from vessels or loading cars. The elevator handled from lake vessels, in 1903, over 20,000,000 bushels of grain.

All metal work of the Mutual Elevator, exposed to the elements, is protected with Dixon's Silica-Graphite Paint, Natural Color.



Globe Elevator Company

OPERATING:
GLOBE ELEVATORS WEST SUPERIOR WIS. CAPACITY 5 000 000
BELT LINE ELEVATORS. SUPERIOR WIS. CAPACITY 2 500 000
PEAVEY DULUTH TERMINAL DULUTH, MINN. CAPACITY 5 000 000

G. W. PEAVEY PRESIDENT — A. L. SEARLE VICE PRES'T
C. F. DEAVER TREASURER — E. N. BRADLEY, SECRETARY.

Duluth. Jan. 23rd, 1905.

Joseph Dixon Crucible Co.

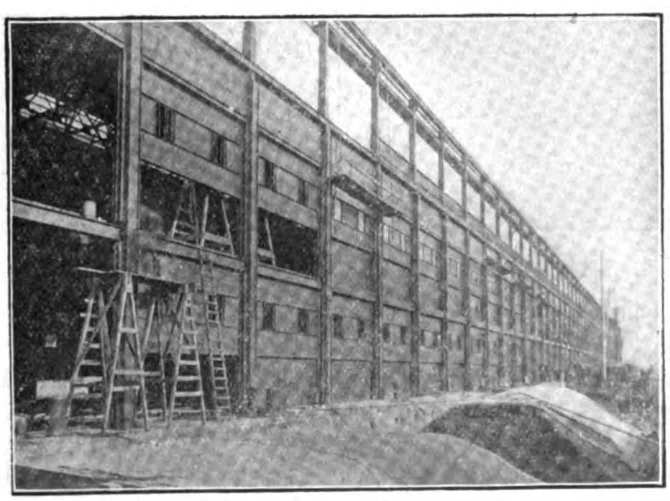
Gentlemen:—

Referring to your inquiry of the 21st inst., regarding your paint on the Globe Elevator System, Superior, Wis., all I can say is that the material speaks for itself. The house was painted in the year 1896, and at the present time looks as if it would stay on another eight or ten years.

Yours respectfully,

F. H. C. Harding

Gen'l Sup't.



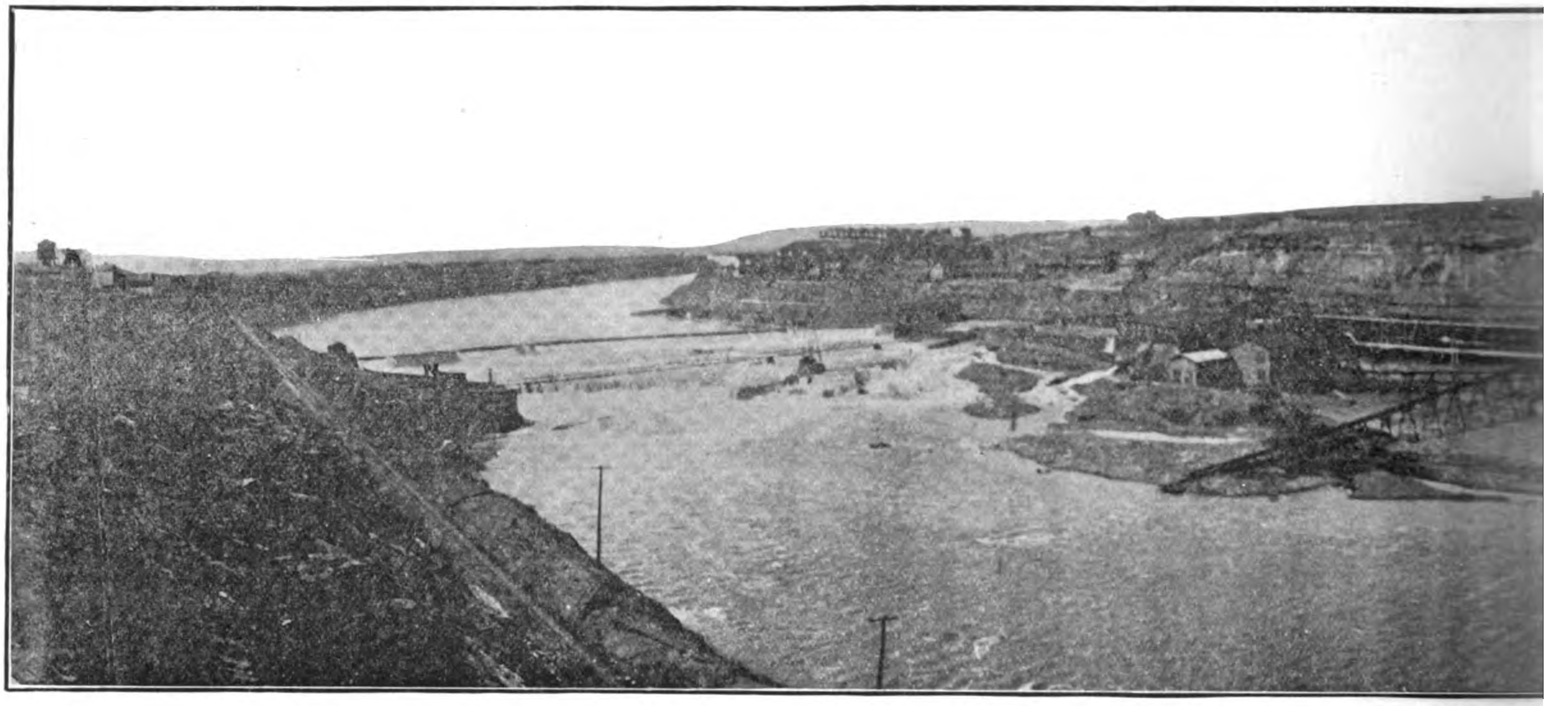
NORTH GERMAN LLOYD STEAMSHIP TERMINAL, HOBOKEN, N. J.

W. F. WHITTEMORE, C. E.

The illustration of Pier 2 of the North German Lloyd Steamship Terminal gives a good idea of the method used by the contracting painters in applying Dixon's Silica-Graphite Paint, Dark Red, for the finishing coat on all exterior iron work of this great steamship terminal, which was erected at a cost of millions of dollars.

Built of heavy structural steel, encased in concrete, with iron jackets enclosing these two types of construction, it is absolutely the most perfect fireproofed building in the world.

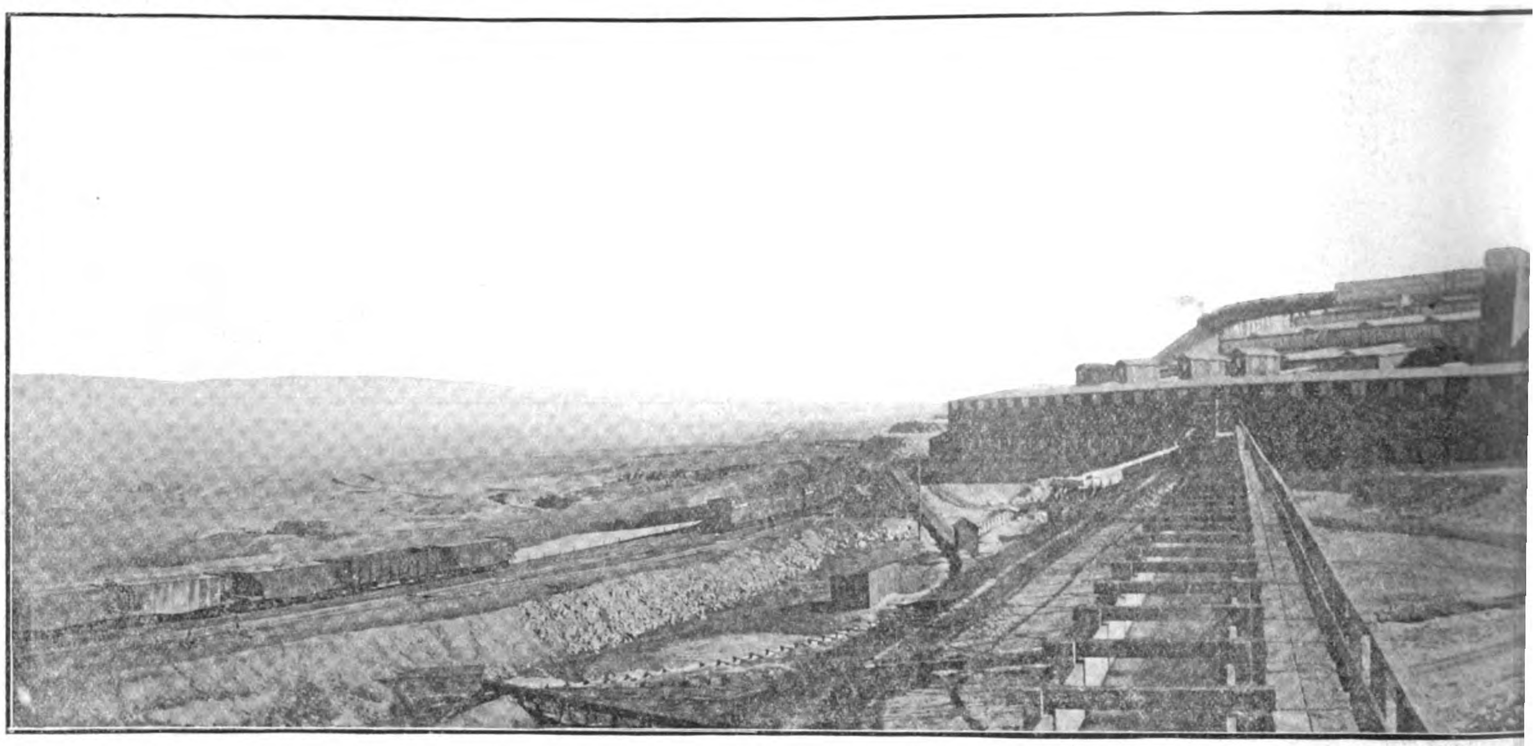
The floor arrangements, roof gardens, elevators and other modern devices provide unrivalled facilities for the comfort and security of passengers.



BOSTON & MONTANA COPPER AND SILVER MININ

The Boston & Montana Smelter, at Great Falls, is strikingly situated on a long sloping hill, around which the Missouri River winds in a great horseshoe curve. The scene after dark is especially impressive. The great masses of shadowy buildings are outlined against the brilliant glare of many furnaces, and studded with myriad electric lights.

From the river edge there is an orderly assemblage of immense refineries, concentrators, roasting buildings, reverberatory and blast furnaces and converters. Offices, storehouses, wash houses, stables, power houses, railroads and giant flumes are systematically distributed throughout the grounds.

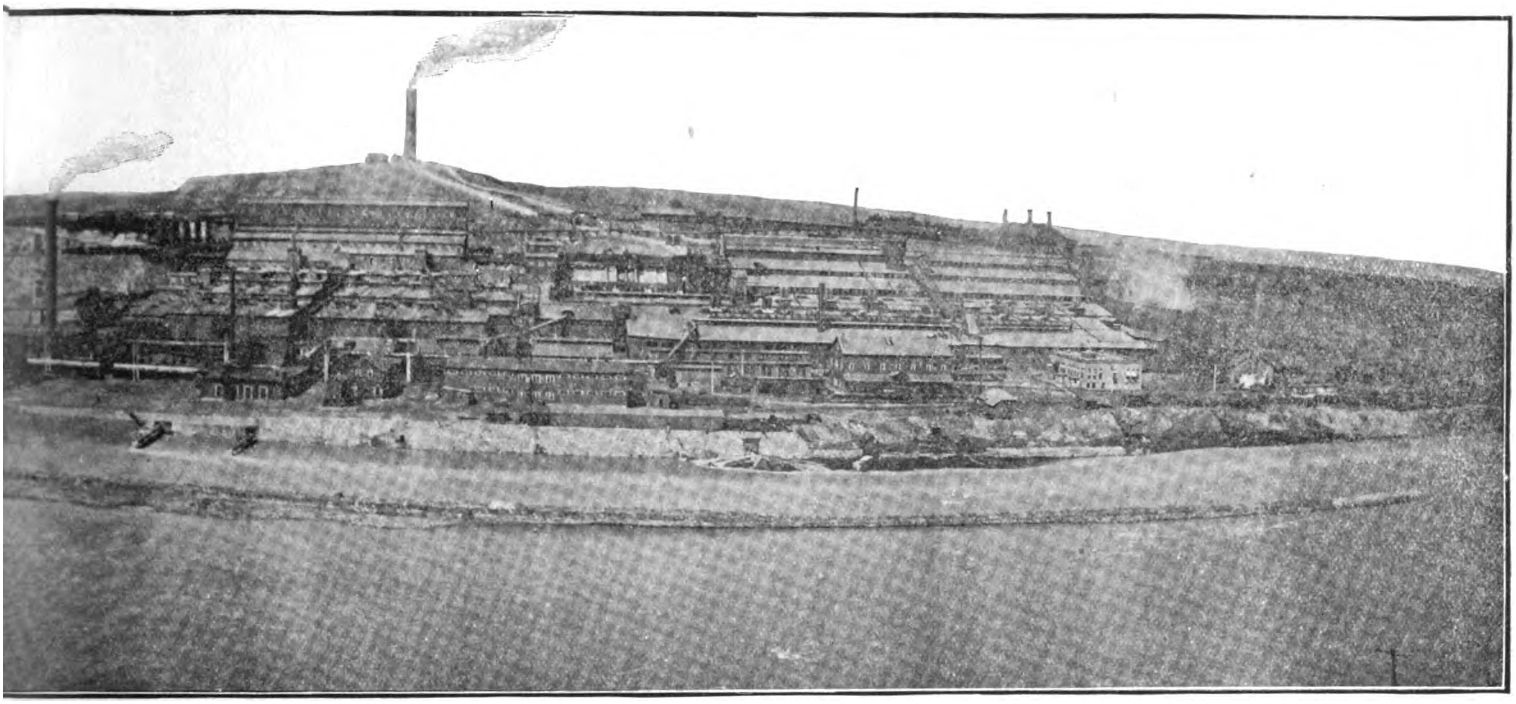


SEVEN-ACRE CONCENTRATOR OF THE WASHOE SMELTER, A

"The Washoe Smelter is the largest and most systematic copper reduction plant in the world."—Charles S. Palmer, of the *Engineering and Mining Journal.*

Anaconda furnishes the immense quantity of water that is necessary in treating the ore of this 5,000-ton plant. The Washoe Smelter is within twenty-five miles of the mines at Butte, Mont.; the ore being brought over the line of the Butte, Anaconda & Pacific Railroad in fifty-ton steel cars of the self-dumping type.

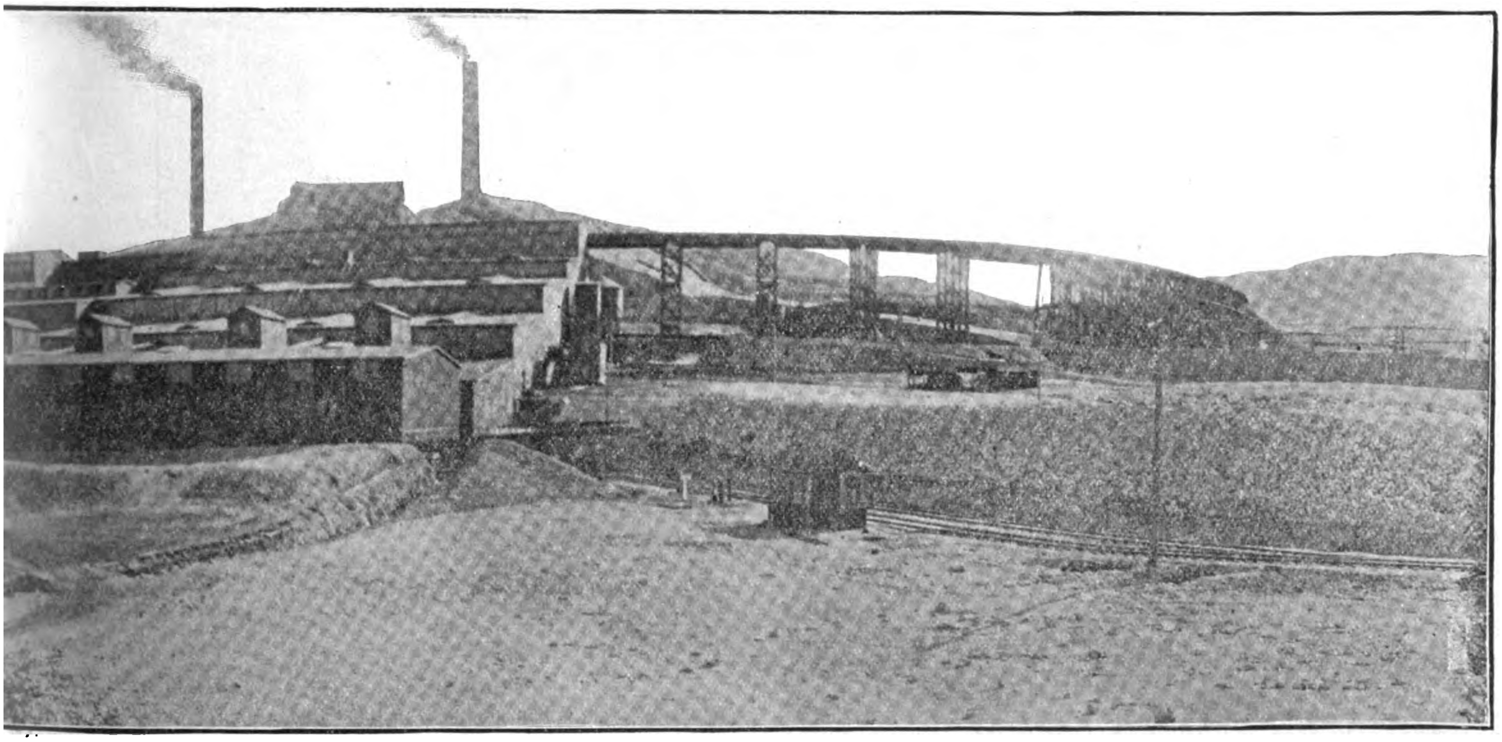
The illustration is a panoramic view of the upper seven-acre concentrator buildings, upper power house, elevated railroad tracks for



COMPANY'S SMELTER, GREAT FALLS, MONTANA.

This smelter has a large electrolytic plant for the refining of blister copper into a state of cathode purity. The economic maintenance of this great plant, subjected as it is to so many destroying influences acting upon the steel and metal work, necessitates the selection of the very best protective paint, that these costly structures may be preserved for the longest time.

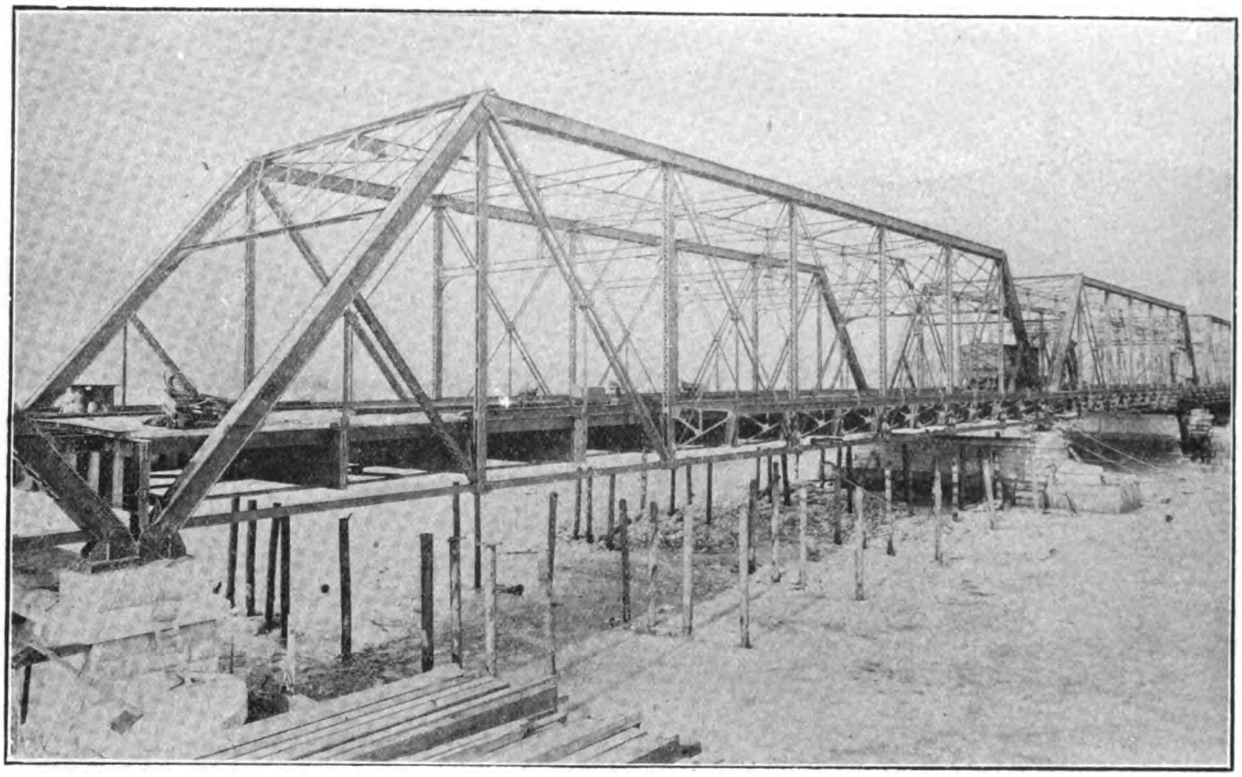
During the last fifteen years Dixon's Silica-Graphite Paint has been subjected to many analytical and practical tests at this plant. These tests have substantiated in every instance our claims for quality, good covering power, and resistance to heat, gases and destructive general conditions. At Butte, Mont., the roofs of the Boston & Montana mine buildings are protected with Dixon's Silica-Graphite Paint.



ACONDA COPPER MINING COMPANY, ANACONDA, MONTANA.

dumping ore into the concentrator bins, and the giant stack, 30 feet aperture at the top and 300 feet high, on the summit of a 300-foot hill. In twenty-four hours this stack discharges a volume of sulphurous gas over the Warm Spring Valley, which, if it were fully oxidized, would make 2,000 tons of sulphuric acid.

Dixon's Silica-Graphite Paint was used for the protection of all interior and exterior steel and iron work during the erection of the different buildings, and it has very successfully withstood the severe conditions of service. At Butte, Mont., the roofs of the Anaconda mine buildings are protected with Dixon's Silica-Graphite Paint.



HIGHWAY BRIDGE ACROSS POTOMAC RIVER, WASHINGTON, D. C.

PENNSYLVANIA STEEL COMPANY, Contractors.

This million dollar steel-truss bridge is 3,000 feet in length and consists of twelve spans (one draw span), with a roadway forty feet and two sidewalks, each eight feet wide. It will be one of the largest highway bridges in the eastern section of the United States.

When completed, in the fall of 1905, it will be used for the electric cars to Alexandria and Mt. Vernon, and for pedestrians and teams.

The paint selected by the Chief of Engineers of the War Department for preservation of the steel work was Dixon's Silica-Graphite Paint.

The Pennsylvania Steel Company are using Dixon's Natural Color for priming—Dixon's Dark Red for first field coat and Dixon's Olive Green for finishing coat.

Lieutenant-Colonel Smith S. Leach of the Engineer Corps, U. S. A., who is in charge of this district, has charge of this most important structure, and it is being erected under the direct personal supervision of Lieutenant John Meigs, Jr., Assistant Engineer, U. S. A.

This bridge is one of the finest specimens of bridge construction of the truss design in the country.

SAVES COST OF FREQUENT RE-PAINTING.

NORTH WOODBURY, CONN., February, 1905.

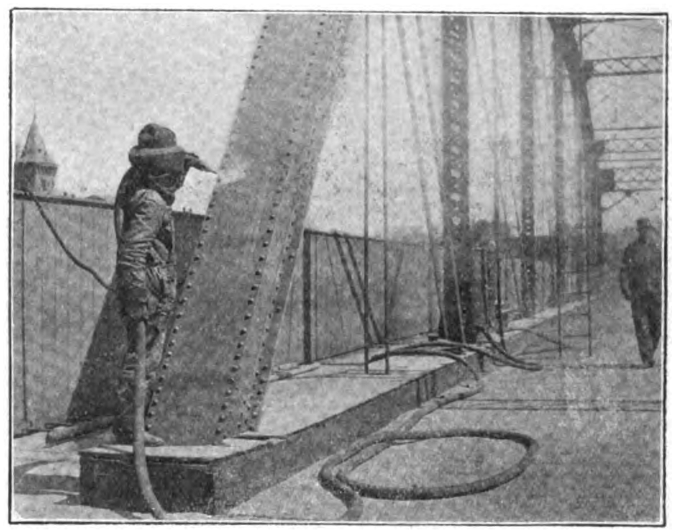
Joseph Dixon Crucible Co.

GENTLEMEN:—The block on which Dixon's Silica-Graphite Paint was used, was built in 1876 and occupied by W. A. Strong & Co., of which the writer was one of the firm, and we took the agency for your paint soon after, using the roof as an advertisement.

It must have been sixteen years before this roof was repainted, and the roof is in fine condition now, and I know of no other paint that stands as well as Dixon's Silica-Graphite Paint.

Very truly yours,

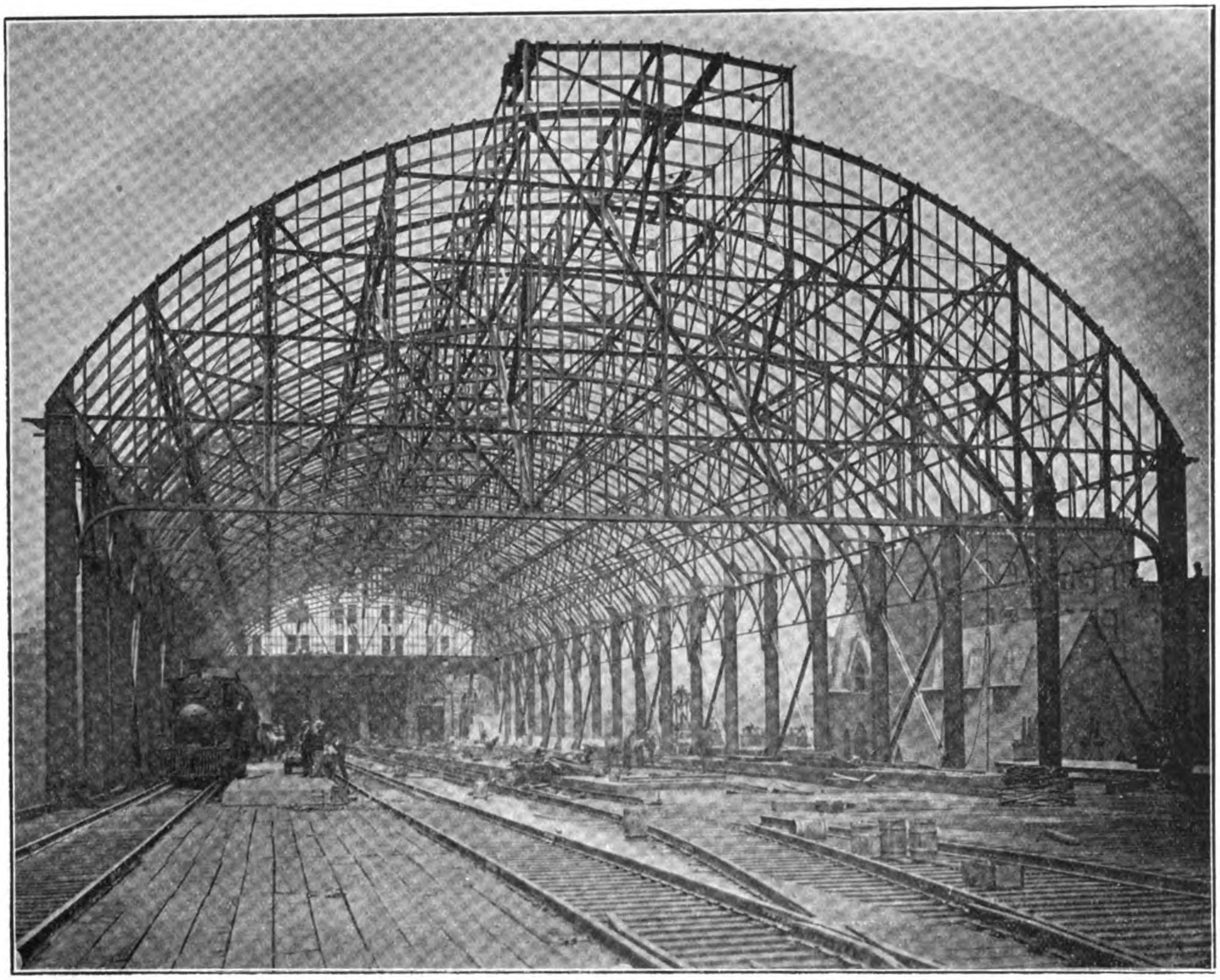
N. M. STRONG.



SAND BLASTING.

Boston and Maine Railroad.

The accompanying illustration shows a sand blast apparatus in operation on one of the bridges of the Boston & Maine Railroad. The mixed air and sand is delivered through a rubber hose to a nozzle, through which the sand is directed upon the work. A uniform grade of dry sand with sharp cutting edges is used. In this manner an absolutely clean surface for painting is obtained. Immediately following this thorough cleaning, the metal receives a well-applied coat of Dixon's Silica-Graphite Paint, which furnishes excellent protection for many years against corrosion.



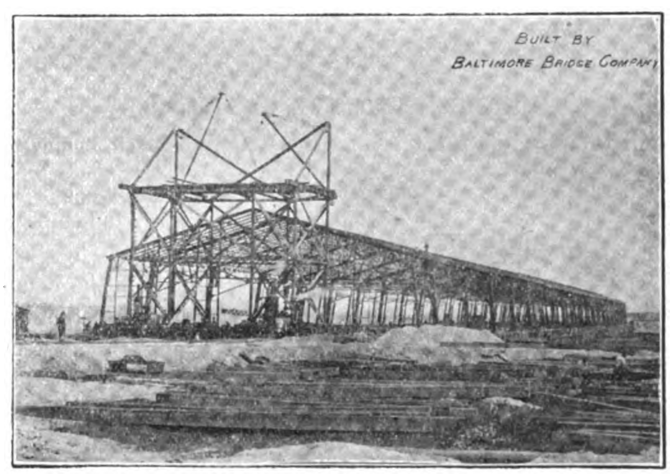
WABASH-PITTSBURGH TERMINAL RAILWAY TRAINSHED, PITTSBURGH, PA.

BOLLER & HODGE, Consulting Engineers, New York City.

The construction view of the Wabash's trainshed, at Pittsburgh, gives an idea of the excellent work embraced in this strictly modern railroad terminal. The trainshed is 413 feet long by 90 feet in width, and contains 600 tons of structural steel. The Pennsylvania Steel Co., Steelton, Pa., furnished the steel for the trainshed, which is built on a steel elevated structure, also furnished by the same company, running from the Wabash's Monongahela river bridge to their terminal building, which is seen in the background. The steel work was erected by the Pittsburgh Construction Co.

Dixon's Silica-Graphite Paint was used to preserve the structural material from the sulphurous gases of engines, Dixon's Natural having been applied at the shop for a priming coat, Dixon's Dark Red for first field coat, and Dixon's Black for finishing coat. Dixon's Silica-Graphite Paint was also used on all steel work of the elevation from the river to the terminal building, and this same paint was used by the American Bridge Co. for shop coat, and the Geo. A. Fuller Co. for field coat of all steel work contained in the Wabash Terminal Building.

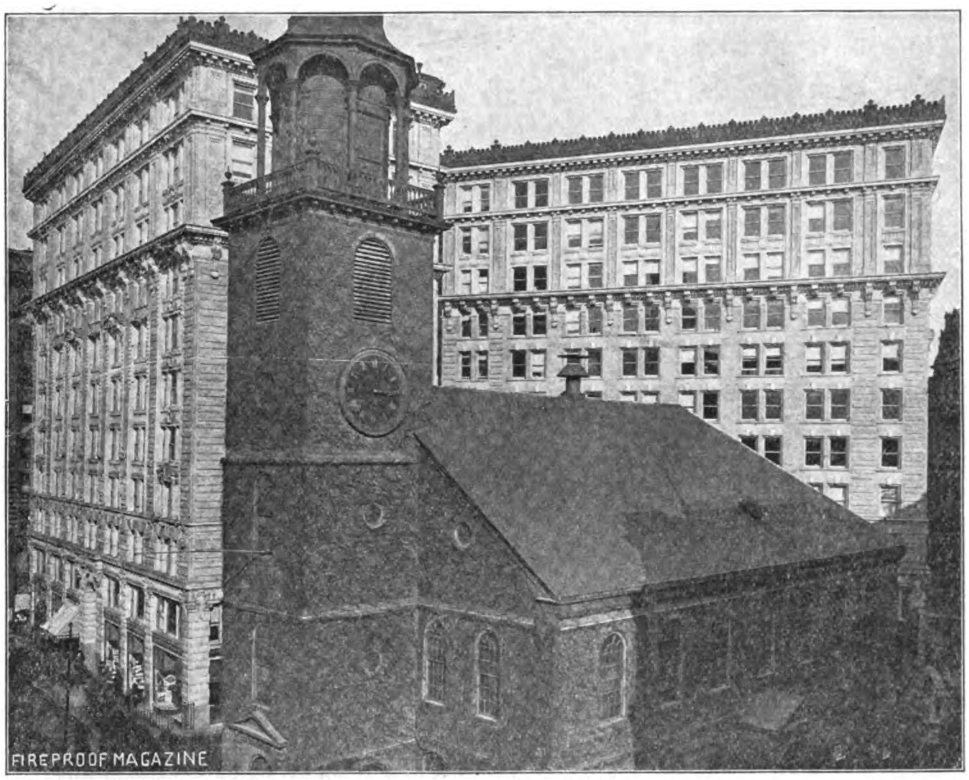
The construction of the terminal building, trainshed and elevated structure of the Wabash-Pittsburg Terminal Railway was under the direction of Joseph Ramsey, Jr., president; J. W. Patterson, vice-president and chief engineer; Boller & Hodge, consulting engineers; J. W. Patterson, Jr., superintendent; Geo. T. Barnesly, resident engineer, and the Robert W. Hunt Co., inspecting engineers.



WESTERN MARYLAND RAILROAD PIER,

PORT COVINGTON, MD.

Two coats of Dixon's Silica-Graphite Paint, Dark Red, were used to protect the 500 tons of structural steel contained in this large freight pier, which measures 824 feet by 104 feet.



THE OLD SOUTH BUILDING.

BOSTON, MASS.

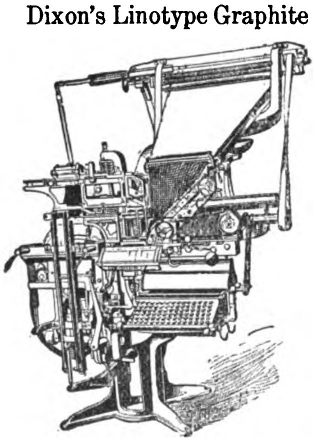
The Old South Building, Boston, is in the heart of the business section of the city. The building was erected under the direction of Mr. Clinton J. Warren, Architect; the supervising architects being Shepley, Rutan & Coolidge. The steel contractor was the Brown-Ketcham Iron Works.

On land adjoining the Old South Building stands Boston's historic Old South Church, on the corner of Washington and Milk Streets.

The structural steel work of the Old South Building is protected from corrosion with a priming coat of Dixon's Silica-Graphite Paint, Natural Color, and a finishing coat of Dixon's Olive Green.

DIXON'S LINOTYPE GRAPHITE.

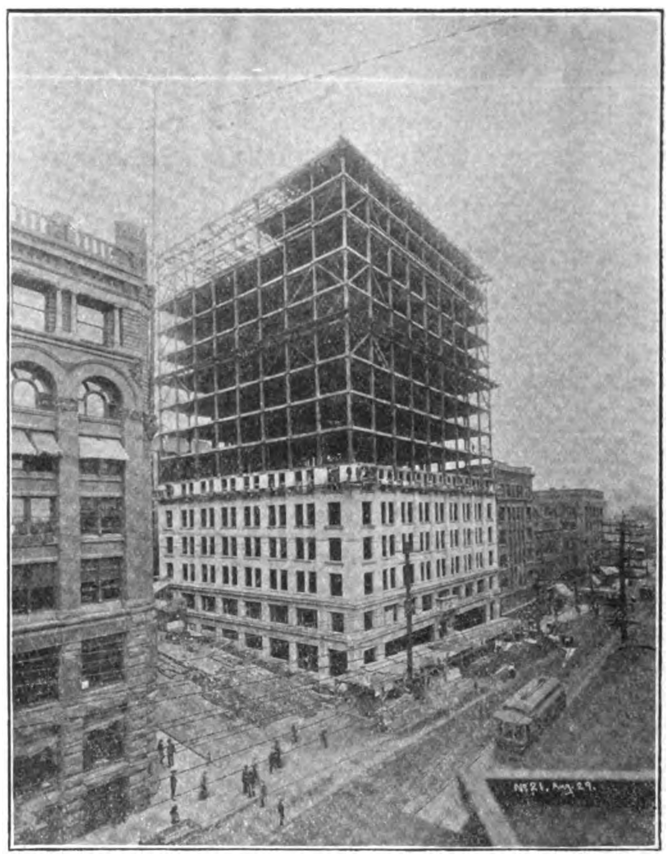
Contributed by the Philadelphia Branch of the Dixon Company.



Dixon's Linotype Graphite for typesetting machines, particularly the linotype. It has been positively determined by the largest newspapers in the country, that it is the only satisfactory lubricant to insure the perfect and easy working of space-bands. It easily displaces all other lubricants, because it will not clog; and also prevents the molten metal from adhering to the parts lubricated.

We prepare this product in two forms, either dry or oiled, from the purest, finest and softest graphite known. The latter contains just enough fine sperm oil to prevent the graphite from flying.

The most effective method to lubricate space-bands is to cover a board with a piece of muslin or cloth on which a quantity of the oiled graphite is sprinkled. As the graphite has a natural affinity for metal, enough adheres to thoroughly lubricate the working parts. The graphite is also applied to the distributing bars, to the slides and each part of the machine requiring delicate lubrication. While not advising its use on the matrices direct, or in the channel-plate, enough of the graphite adheres to the space-bands to give the matrices a light coating. This makes them practically proof against burring and causes the magazine to become very smooth, permitting the matrices to fall freely. One of the largest Philadelphia papers, now using only its second set of matrices, after the machines having been in use over twelve years, day and night, ascribes this long life to the daily use of graphite on the space-bands.



15-STORY ALASKA BUILDING, SEATTLE, WASH.

FAMES & YOUNG, Architects, St. Louis, Mo.
JAMES BLACK MASONRY AND CONTRACTING CO., Builders, St. Louis, Mo.

Structural Steel Work Protected
with Dixon's Silica-Graphite Paint, Natural and Dark Red Colors.

HOTEL ASTOR.

Times Square, 44th to 45th Streets, New York City. CLINTON & RUSSELL, Architects.

This latest addition to the famous hostelries of the metropolis of the New World is strictly worthy the name *comfortably elegant*. The exterior architecture and the interior arrangements reflect highly creditable to the taste and practical knowledge of the architects, Clinton & Russell, and the proprietor, Mr. Wm. C. Muschenheim, of Arena fame. The exterior electrical display at night is unquestionably the finest of any building in the world.

Many hours can be spent by the student of old New York days in the rooms depicting the town in Colonial and later eras. The large grill room in the form of an Indian council chamber, with its rare photographs of Indian life and Indian trappings, is a museum of wonder. The Chinese, Japanese and East Indian nooks are very inviting. The beauties of the Italian palm room cannot be described but must be seen to be appreciated. The dining room for men in German Renaissance, the dainty dining room for women in the style of Louis XIV., the grand dining hall, two stories in height; the College Hall, the six hundred guest rooms, and the rose-garden arrangement for the roof restaurant mark all that is elegant and modern in hotel construction.

Dixon's Silica-Graphite Paint was used for the protection of the 4,000 tons of structural steel contained in the Hotel Astor. The bright lights do not shine on its surface each night, but, covered with brick and building materials, it is doing its work in preserving the strength of this grand structure for the entertainment of this and future generations.

IRREFUTABLE EVIDENCE.

HOTEL CHELSEA,
ATLANTIC CITY, N. J.,
Nov. 1, 1904.

Joseph Dixon Crucible Co.

GENTLEMEN:—I have used Dixon's Silica-Graphite Paint on the roof of the Hotel Chelsea. I find it a durable paint, and believe it is the best material purchasable for the protection of metal exposed to the salt air and the severe conditions prevailing along the coast. Yours truly,

(Signed),

J. B. THOMPSON & Co.

FRIENDSHIP.

"Friendship means help and support and if in the hour of need we do not give it we are not a friend.

"If that one to whom we have promised friendship is unhappy enough to be sensitive as well as earnest, it cannot be prophesied how much real good a hearty word or handclasp may do him in time of mental trouble. Then it is that a true friend will think it well to tell that one something encouraging, strengthening and reviving."—*Exchange.*

YOUTHFUL ORATOR.

I have got a red nose, pa's eyes an' his temper, so ma says. My ma, she's all to the good all right. She's got a switch, but I like sticks better, the red an' white peppermint ones. One day ma said she wanted to paint her flower pots, an' I got some dark red paint an' did it all by myself. Ouch, I got my reward all right from her. My! but wan't she mad; 'cause the paint wus just like rubber over the pots, it stretched so. She said as to how it wouldn't dry. Oh! but say, two days after when she went to put the flowers in them pots, crooky shakes, if that paint wan't all dried nice as you plese; look'd as 'f they wus chiny.

Ma come fer me, an' I got inside the chicken-coop, 'cause I wus shaky. Ma, she yells, "Lucifer Wobblekins, where did you git that paint?" I says, "Over to the big factries, the Dixon Companie." Well! ma wus beat. She thinks them Dixon people ar' mighty fine fer havin' nice paint. An' say, she guv me two sticks of candy, three cents, and said I could go swimmin' next summer. Gess I'll have to git some more of the same paint an' fix them hollyhawks so we'll hev them all the year roun'!

I'll get some black paint next, too, and paint Shucks an' Mugguns; them's our two ducks.

I gotter go home now an' think what else needs paintin'.

—ELIZABETH V. SCHENCK.

WHERE THE MERCURY FREEZES.

IN the latter part of 1904 we received, in answer to one of our advertisements, a request for a copy of "Graphite as a Lubricant" from an engineer in the Klondyke. The scarcity of correspondence with this far-away and forsaken section of the country naturally aroused a little interest on our part to know what graphite is used for up there, and so we wrote to our correspondent asking if he would not favor us with a little article telling how he found Dixon's Graphite valuable up there where the mercury freezes solid in the thermometers. Here is his letter:

DAWSON, ALASKA, Jan. 6, 1905.

Joseph Dixon Crucible Co.

GENTLEMEN:—You asked me to write you a little article on how we use graphite in this country. I am glad to do so but you will have to correct any mistakes as I am no writer. I am an engineer and hunter. As you know, it gets fearfully cold here in winter and the ground has to be thawed out in the mines by steam before it can be dug. We run a line of pipe from the boiler to the mine shaft, and so down into the mine where it is used wherever digging is going on. As you can see, the pipe has to be disconnected every few days, and when a pipe is frozen it is mighty hard to disconnect. After a good deal of trouble with trying to disconnect frozen and rusted pipes, I put Dixon's Graphite on all the joints and, no matter how cold it gets, these joints will always come apart with perfect ease, and the graphite works to perfection. Before I used graphite I constantly split the pipes and had to cut new threads on them.

I have hunted up the Klondyke River for three winters, killing moose and caribou. The first winter I hunted up there, our party brought back five tons of meat and sold it in Dawson for thirty-five cents per pound.

One morning I got into a "bond" of caribou, and I should say there were 800 in the "bond." I got within 150 yards of them. I was armed with a 30-40 Winchester, and taking aim pulled the trigger; but there was "nothing doing." The temperature was 72 degrees below zero that day, and the oil on the lock and the firing-pin was frozen solid and would not set the cartridge off. Possibly you can imagine how I felt and what I said. You must know that things tighten up somewhat when it gets 65 or 70 degrees below. There was nothing to do but to go back to camp where I took the gun apart, thawed out the oil and wiped it off, coated all the parts freely with Dixon's Fine Flake Graphite and then a better working gun you never saw.

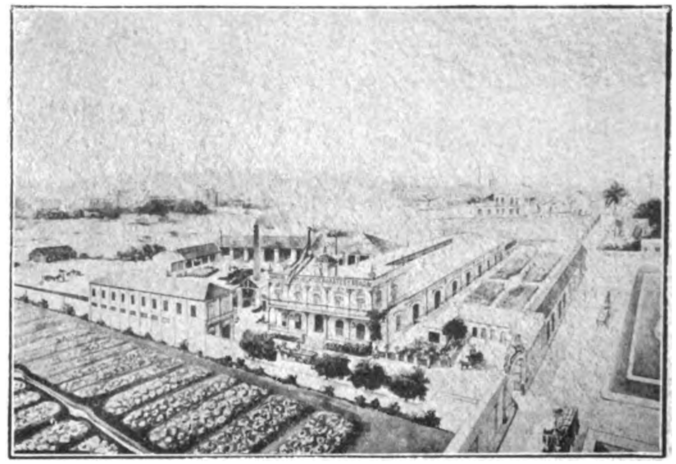
I went out every day after that and never once did my rifle refuse to work. There were six other hunters up that winter and I gave them all some of Dixon's Graphite and told them how to use it, and now Dixon's Graphite is one of the most important things in a hunter's outfit around these parts.

I suppose there are some good sportsmen down in New Jersey, and if any of them want to have good hunting, all they have to do is to come to the Klondyke and I will give them a good "run for their money."

I hunt every winter and run mining machinery in the summer. I am very sorry that I cannot receive your booklet, as we are in Canada and no printed matter comes in here until the river opens, because all the mail comes in and goes out by dog-teams and they do not carry anything but first-class mail.

I hope you will excuse the Dixon Pencil with which I had to write this letter, for it is 55 degrees blow zero to-day and the ink is not working. Very truly yours,

(Signed) WILL D. REILEY.
46 B, Bonanza.



SEBATES & BOADA SOAP AND CANDLE WORKS, HAVANA, CUBA.

The letter in Spanish and its translation, written to Mr. Charles Blasco, representing Dixon's Silica-Graphite Paint in Cuba, is good evidence of the wearing qualities of our product in its use along the sea-coast in tropical climates.

HABANA, 2 de Febrero de 1905.

Sr. D. Charles Blasco, San Ignacio No. 11, Habana.

MUY SR. NUESTRO:—Tenemos el gusto de participar á Ud. que la pintura graphite que fabrican los Sres. Joseph Dixon Crucible Co. de Jersey City, N. J., que le compramos el año pasado para pintar todos los techos de plancha de hierro galvanizado que existen en nuestra fábrica de Jabón y Velas, es excelente y dá muy buen resultado; pues apesar de clima de este pais, se conserva dicha pintura bien adherida á las citadas planchas que no permiten su desgaste.

Aprovechamos esta oportunidad para reiterarnos sus atentos, S. S., Q. B. S. M.,

SABATES Y BOADA.

TRANSLATION.

Mr. Chas. Blasco, San Ignacio 11, Havana.

DEAR SIR:—We take pleasure of informing you that the Graphite Paint manufactured by the Dixon Crucible Co., Jersey City, N. J., and which we purchased from you last year to paint all the galvanized iron roofs of our soap and candle factory, is of excellent quality and has given very good results, for, in spite of the climate of this country, the paint is well conserved and adheres to the said roof, not permitting same to oxidize.

We beg to remain, dear sir,

Very truly yours,

(Signed) SABATES & BOADA.

A SCIENTIFIC CONSIDERATION OF DIXON'S FLAKE GRAPHITE PIGMENT.

We often hear it said of some particular material used as a paint pigment, that it is remarkably fine; that it will pass through a 200 mesh sieve. Fineness of pigment is much to be desired, because the finer the particles of the pigment the smaller the spaces between them; and the smaller these spaces which in the paint film are occupied by the dried linseed oil, the slower the action of those forces which tend to destroy the oil, and there is less tendency to porosity as a result of microscopic bubbles and tubes in the oil itself.

But what we desire to call attention to particularly is, that the size of the sieve through which the material may pass, is not always a measure of its fineness. It may be approximately true of a granular substance like oxide of iron, but it is not true of flake graphite. A true measure of fineness would be a relation of weight to the total surface of the particles. Thus, if we take a cube which will just pass through the mesh of a 200 sieve and split it centrally, it will still just pass through the sieve, but it is now nearly twice as fine, because the area of its surface is nearly twice as great. If we split each of the pieces and split each resultant piece a second time, these will still just pass through the mesh of the 200 sieve; but they are now nearly eight times as fine, because the total area is nearly eight times as great.

If we consider each particle of pigment as a shield protecting the oil which lies below it, then the particle split into eight sheets will afford eight times the protection it did at first.

This assumption becomes the fact when Dixon's Silica-Graphite pigment is considered. If we carefully measure by means of a micrometer calliper some of the flakes of graphite from which this pigment is prepared, we shall find that none of them have a thickness of 1/1000 inch, while the thickness of some is so little as not to show on the calliper at all, certainly less than 1/1000 inch.

This pigment is inert, exerting on the oil none of the harmful influences which reduce the term of its natural life. It is also an excellent lubricant; unctuous, some call it, permitting the use of the greatest possible volume of pigment, without imparting such a drag to the paint as to render the application of a good substantial coat impossible.

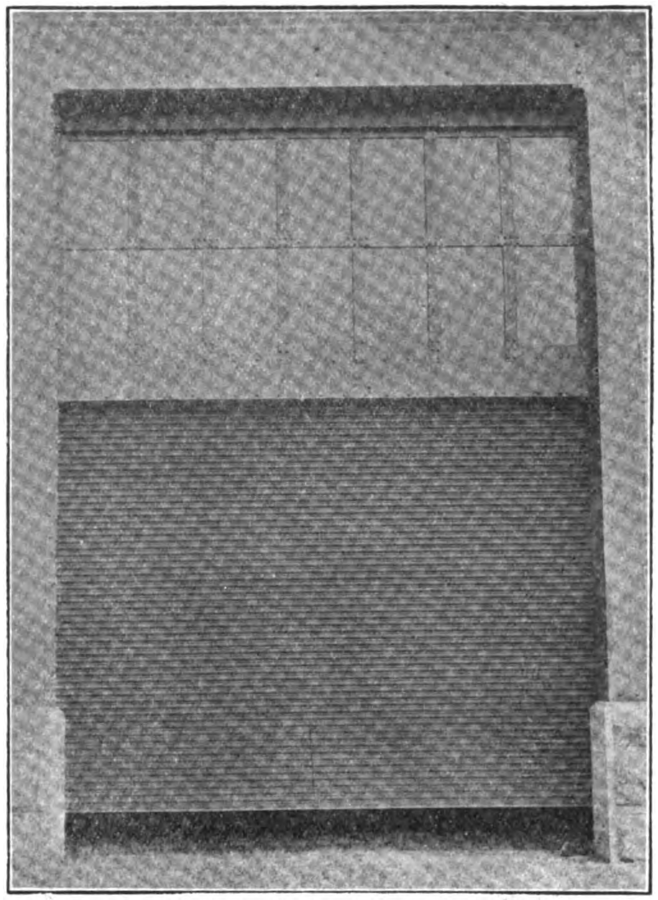
These three qualities have made Dixon's Silica-Graphite Paint what it is, the standard of all protective coatings.

STRIFE.

The law of worthy life . . . is fundamentally the law of strife. . . . It is only through labor and painful effort, by grim energy and resolute courage, that we move on to better things.—*Theodore Roosevelt.*

ACTUAL ECONOMY.

Steel poles, roofs, tanks, bridges, buildings, smokestacks, painted *this* season with Dixon's Silica-Graphite Paint, will not require repainting for *many* seasons.



STEEL ROLLING DOOR,

Bulkhead Building, North German Lloyd S S. Terminal.

W. F. Whittemore, C. E , Hoboken, N. J.

Certain features of Dixon's Silica-Graphite Paint qualify it over all other paints for use on steel rolling doors, that are folded up each day.

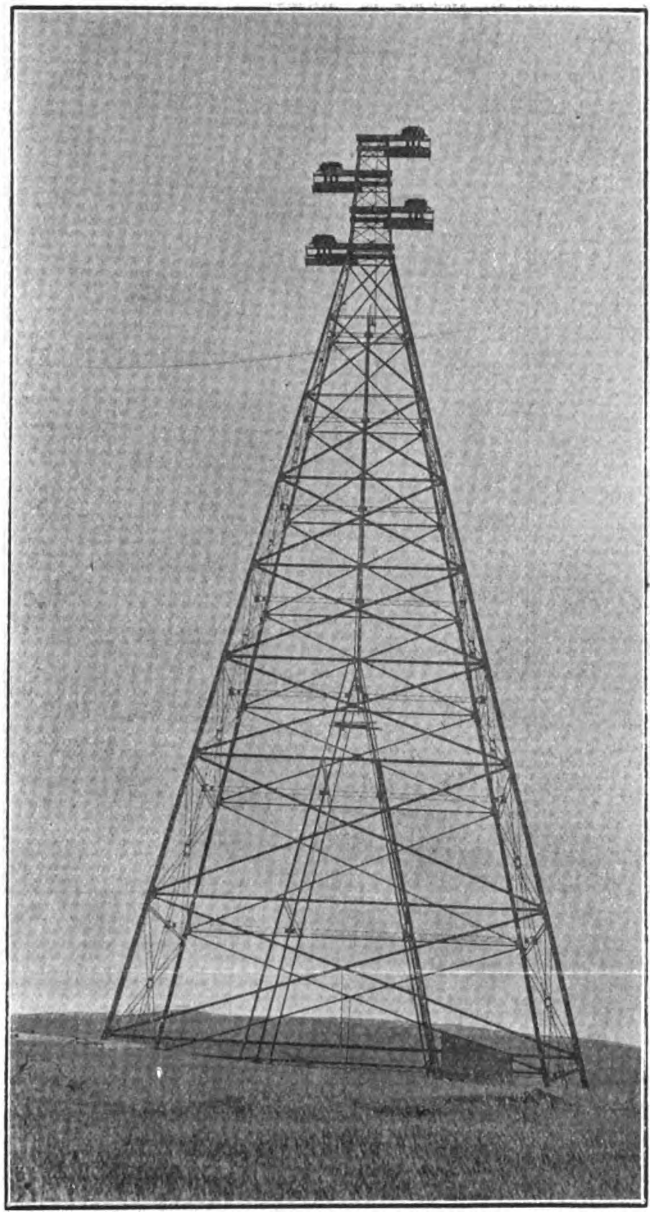
Dixon's Ticonderoga Flake Graphite Pigment has lubricating properties that allow of the steel slats folding easily, and without destroying the paint coating. Dixon's pigments being inert, form with the linseed oil the maximum of elasticity, and consequently a highly tenacious coating.

Dixon's colors successfully withstand the combined destroying influence of the mechanical action of rolling doors and full exposure to the elements.

Wm. H. Brodie Co., New York City, contracting agents for the Kinnear Steel Rolling Doors, applied by brush Dixon's Silica-Graphite Paint, Natural Color, for priming, and Dixon's Dark Red for finishing coats, on all rolling doors of the immense bulkhead building of the North German Lloyd Steamship Terminal, Hoboken, N. J.

SALT MONEY.

Many, many years ago salt was so hard to obtain, but so necessary to have, that Roman soldiers were paid part of their wages in salt. Now, the Latin word for salt is *sal*, and from that came the word *salarium*, meaning salt money. Finally the soldiers were paid only in money, but the term *salarium* was still used to designate these wages. From this old Latin word comes our English word salary. Do you see, then, why we say of a worthless fellow that he "is not worth his salt"?—*Selected.*



MAIN TOWER.

A 4,427 Ft. Span in an Elecric Transmission Line, Bay Counties Power Company, San Francisco, Cal.

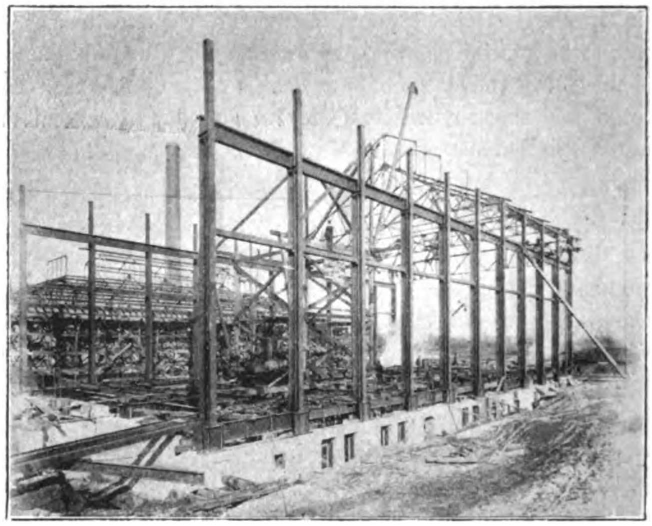
Carrying high-tension electrical energy across navigable tide-water in cables which had to be held at least 200 feet above high-water level, is one of the features of the 140 miles transmission line of the Bay Counties Power Company of San Francisco, Cal.

The waterway at the point of crossing is about 2,750 feet wide, and the topography of the land is such that a main span of 4,427 feet was necessary, involving the erection of three steel towers and a total cable system comprising four cables, each nearly 6,400 feet long.

The main tower which is illustrated, is 225 feet high and is of iron and steel throughout, excepting cross-arms for carrying the cable saddles. The base is 68 by 90 feet.

The plan of the crossing, including designs of the towers and anchorage connections, as well as the plan for hoisting the cables, was worked out by Mr. F. A Koetitz, Chief Engineer of the Pacific Construction Company, and was passed upon by Mr. R. H. Stirling, Division Engineer of the Bay Counties Power Company, and Mr. J. D. Galloway, Consulting Engineer of the same company.

The Main Tower, the South Tower and the Leaning Tower in the 4,427 foot span of the Bay Counties Power Company's electric transmission line are painted with Dixon's Silica-Graphite Paint, which was supplied by Mr. James G. Allen, Manager, Dixon's Salesroom, No. 304 Market Street, San Francisco, Cal.



LARDNER'S POINT PUMPING STATION, PHILADELPHIA, PA.

Being built in connection with the greatest filteration plant in the world. The municipality has spent to date $22,000,000 on its filteration plant to provide good water. The gigantic filteration beds at Torresdale are connected with the Lardner's Point Pumping Station by a three-mile conduit, with a capacity of 300,000,000 gallons daily.

The excellent reputation of Dixon's Silica-Graphite Paint, in and about Philadelphia, procured its selection and use for the entire structural steel work of this large pumping station.

DIXON'S EVERLASTING GRAPHITE AXLE GREASE.

Almost every mail brings us letters like the following:

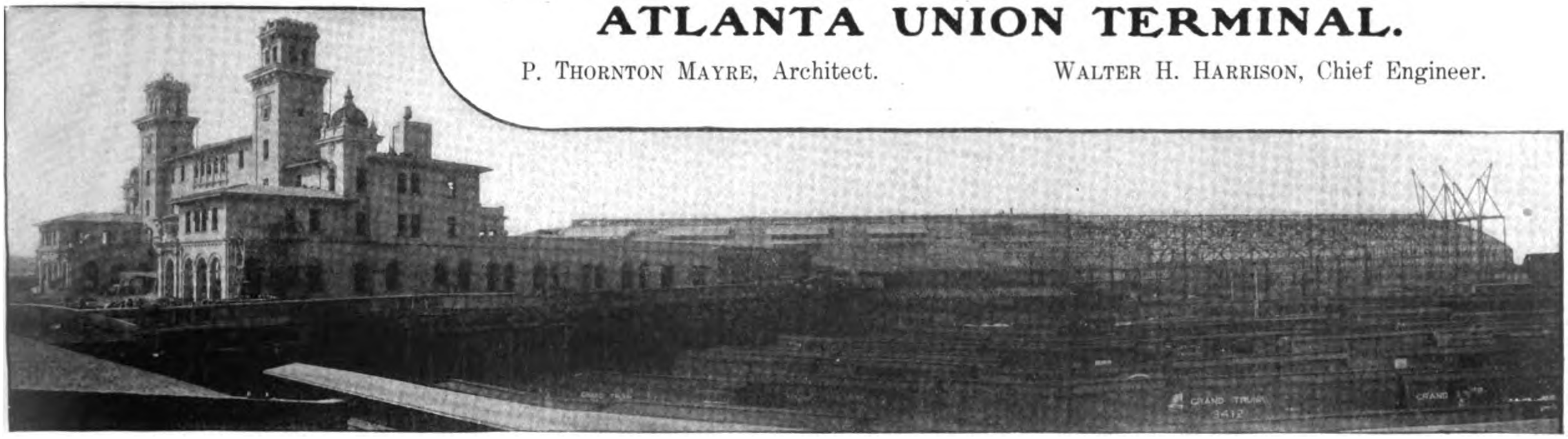
"——— & ———, CUT STONE CONTRACTORS,
FT. WAYNE, Ind., Jan. 27, '05.

"GENTLEMEN:—Replying to yours of the 24th we beg to say that the ten-pound pail of axle grease we bought of you in October, 1901, is giving excellent satisfaction, but as it will last for some time yet, we will not need any at present. We shall send in an order as soon as we are in need of more."

These letters are coming from fire departments, breweries, trucking companies, livery stables, and wagon owners. They all speak of the axle grease in the highest possible terms, and if any of our readers who own a wagon are interested and would like to make a trial for themselves, a postal card request will bring a can large enough for a trial."

ATLANTA UNION TERMINAL.

P. Thornton Mayre, Architect. Walter H. Harrison, Chief Engineer.



PANORAMIC PHOTOGRAPH TAKEN DURING CONSTRUCTION OF THE UNION TERMINAL, ATLANTA, GA.

Structural Steel Work of the Long Train Shed Has Been Protected Against Sulphurous Gases of Locomotives With a Priming Coat of Dixon's Natural Color, First Field Coat Dixon's Dark Red, Finishing Coat Dixon's Black.

PAINTING OF STEEL CARS.

The following is a report made before the recent convention of the Master Car and Locomotive Painters' Association:

It is the sense of this association that, in the construction and painting of steel cars, the following points are of vital importance for their preservation:

First—All flash or mill scale, rust, oil, grease and dirt should be entirely removed from all parts entering into the construction of cars before any paint is applied. We believe that this can be best accomplished by the use of the sand blast.

Second—During construction, all overlapping joints, wherever metal is placed upon metal, should be thoroughly coated with a heavy mixture of moisture-repelling paint.

Third—The initial painting, being of the greatest importance, should be done in the best possible manner. The first coat should be applied immediately after metal has been sand-blasted and before the cleaned surface can accumulate rust.

The material should be of an elastic nature and sufficient time should be allowed between coats for drying. It should be put on evenly in a workmanlike manner.

Fourth—We believe that not less than three coats should be applied to all exterior parts of body, including underframing, and two coats on interior of body; also all parts of trucks except wheels and axles.

Fifth—We recommend a rigid inspection of the cleaning and painting of cars under construction by competent, practical men, believing this in the line of economy.

Sixth—We would suggest that the abuse of cars in service be stopped by discontinuing the loading of hot slag, billets, etc. Also that the hammering of side sheets and other injurious methods used to facilitate unloading be discouraged.

Seventh—In the repainting of cars, all corrosion and loose paint should be removed with steel scrapers and wire brushes or the sand blast, and not less than two coats of an elastic preservative coating applied to all cleaned parts.

As the greatest loss from corrosion is found on the interior parts of coal-carrying cars, we would consider the matter of painting those parts worthy of serious consideration.

DIXON'S PENCILS.

It was not so very many years ago that the styles and kinds of lead pencils made by the Dixon Company were comparatively few, but in the last ten years all is changed.

Now each kind of business demands its individual pencil. The architect, being more familiar with the marks used by European makers, demands that his pencils shall be stamped (B), (H B), (F), etc., and he generally prefers those of a yellow finish; the mechanical draughtsman wants his in harder grades and hexagon in shape; the merchant wants a medium soft pencil, free from grit and generally with an eraser; the editor wants a particularly large, soft lead, that makes the blackest mark with the least amount of effort.

For bookkeepers there are made pencils that can be sharpened to a fine point and yet last for months. For railroad people there are jet black pencils that will not blur or rub, pencils that are indelible, and letters written with them can be copied the same as if written with ink. This shows that pencil-making, like most other industries, has become specialized, and the Dixon Company has kept not only abreast, but ahead, of the times in making not only what has been demanded by the trade, but by anticipating their wants.

As, for example, they have placed upon the market a pencil that is particularly soft and intensely black, yet it is not encased in cedar, neither does it contain a particle of graphite. It is intended for artists' and architects' use as a shadow pencil, and is also adapted to the wants of the merchant and railroad man as a checking pencil.

There seems to be no end to the uses to which the Dixon pencils can be put.

The other day a passenger on a railroad train was seen to cut the pages of a magazine with one of Dixon's pencils and afterward to use it as a bookmark. It was the "Palisade," and its flat shape made it particularly well adapted for this purpose.

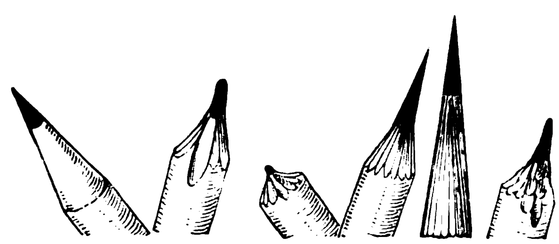
The Dixon Company have issued a Pencil Guide. It is arranged alphabetically according to vocations, and is a great help in selecting just the right pencil for the particular work desired. It is sent free to all.

TRINITY BUILDING, NEW YORK CITY.

F. H. KIMBALL, Architect. S. C. WEISKOPF, Engineer. GEO. A. FULLER CO., Builders.
Structural Steel Work is Painted With Dixon's Silica-Graphite Paint, Dark Red and Natural Colors.

GIVE ME THE OLD.

"Old wood to burn!
Ay, bring the hillside beech
From where the owlets meet and screech
And ravens croak;
The crackling pine and cedar sweet;
Bring, too, a clump of fragrant peat,
Dug 'neath the fern; the knotted oak,
A faggot too, perhap,
Whose bright flame, dancing, winking,
Shall light us at our drinking;
While the oozing sap shall make sweet music to our
thinking." — R. H. MESSINGER.



"It is just impossible for me to keep a lead pencil. People are always borrowing, and they always forget to return."

"Why, I never have any trouble. See, I've got a whole vest-pocketful of pencils."

"Doesn't that prove just what I said?"—*N. Y. Tribune.*

THE GRANBY CONS. MINING AND SMELTING CO.

Grand Forks, British Columbia.

The interior view of one of the large smelter buildings that was erected about five years ago, will give our readers an excellent idea of the methods used in refining gold and copper ores. It also suggests the high degree of heat and volume of gases that are attacking almost constantly the coating of Dixon's Silica-Graphite Paint on the structural steel work and corrugated iron roof.

Dixon's Silica-Graphite Paint has withstood these conditions so satisfactorily that it has been used to repaint the entire plant—interior and exterior.

HARDWARE AND PAINT DEALERS.

Your stock for the spring trade is not complete without that excellent seller, Dixon's Silica-Graphite Paint, a money-maker for you and the purchaser. Sells well, wears well, covers well, looks well. Recommend it to your customers for the protection of fences, roofs, bridges, smokestacks, boiler fronts, structural and ornamental iron work. Attractive paint literature supplied with stock orders. Immediate attention to your inquiries and orders. Joseph Dixon Crucible Company, Jersey City, N. J.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, typewriter work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

Graphite

VOL. VII. MAY, 1905. No. 5.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

THINK!

Ourselves, the excellent house organ of the Larkin Company, brings to mind the value of the ability to think and to think at the right time.

The confession of youth is: "I didn't think." It is more than a confession, it is the usual excuse made for failure, and this excuse is not always confined to those of youthful years.

When the firm you work for furnishes shoe polish and brushes for your convenience and a young man puts a splendid polish on his shoes at ten minutes past eight instead of ten minutes before eight, he does it because he does not think.

When the firm you work for furnishes lavatory conveniences with mirrors and toilet preparations, the young woman who leisurely stands before the mirror from 8.15 until 8.25 with possible pardonable vanity to complete a toilet which should have been completed at 6.30, does so because she does not think.

The young women who overcrowd the lavatories at 11.30 in order to be ready for luncheon at 12 do so, no doubt, because they do not think.

When the company you work for furnishes all necessary toilet accommodations, and young women use the sewer for a depository for articles that belong in the wastebasket, garbage can or sanitary receptacle, thereby causing an overflow of filthy water on seven floors and a hurry call for a dozen workmen who approach their task with justifiable profanity—if profanity is ever justifiable—and with vulgar comments on the perversity or ignorance of young women, and who clean the sewer at an expense of from $15.00 to $20.00 in labor, to say nothing of the damage to property and danger to health, they do simply because they do not think.

But people are paid for thinking more than for any other human exertion. If you expect others to think for you, you must expect them to draw the money that is paid for the thinking.

A clerk says: "I wonder why I wasn't remembered when they went over the payroll." He was remembered, remembered *minus* because he did not think *plus*.

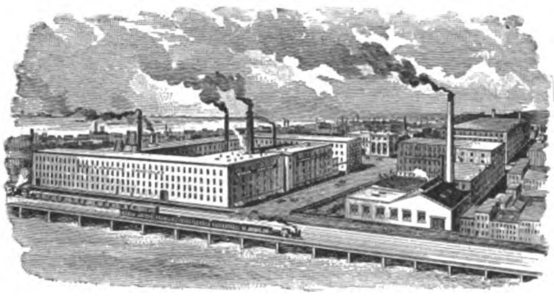
SPRING POEM.

In the spring the whiskered farmer drinks hard cider from a can, throwing wads of burning language at the indolent hired man. In the spring the grand old granger plants his succotash and corn, and the cinchbugs come and eat it, while he sleepeth in the morn. In the spring the old sow wanders to some quiet fen or brake and returns with seven piglets toddling cutely in her wake. In the spring the good dog Rover hides behind the bushes damp, waiting always, waiting ever, for a chance to nail a tramp. In the spring the bull so gentle, which has been a pet for years, gores the poor confiding farmer, sits on him and eats his ears. In the spring the youths and maidens go to picnics in the woods, packing with them in their baskets sandwiches and other goods; and they fall into the river, and the chiggers eat them up, and they come back from the picnic swollen like a poisoned pup.

I have hot pains in my larynx and my liver is out of whack, there are rumblings in my stomach, there are creakings in my back. When I go to bed at evening I can only roll and groan, for my mouth tastes like a hen's nest, and my head feels like a stone. And I read the daily papers where they tell of Snooper's pills, as a sovereign specific for these kinds of vernal ills. And I buy the pills and eat them, and I feel a whole lot worse; there are times when I am longing for a sleigh ride in a hearse. And the ancient dames come to me, and they brew their magic tea, and they say if I will take it, I'll feel happy as a flea. But their dismal, dark decoctions only make me shriek and wail, and I wish that all herb doctors could be carted off to jail. In the spring the wily stranger comes to sell a patent oat, and he gets the names of victims to a thousand-dollar note. In the spring you make a garden, full of things you like to eat, and the chickens come and scratch it all to thunder and repeat. In the spring your lawn is pretty, and you point to it with pride, till some cattle come and spoil it in the silent eventide.

In the spring the groaning husband eats his victuals in the barn, for his wife must clean the mansion, and she doesn't care a darn; and the yard is full of carpets, and the trees are full of sheets, and he has to live on sauerkraut, cistern water and sliced beets. Oh, a woman's in her glory when she tears things all apart, piling beds and chairs and pillows in a way to break your heart. And at night the groaning husband has to sleep upon the porch, and he feels so plum disgusted that he can't enjoy his torch. When the blamed old cleaning's over, then the wife is taken ill, and it keeps her husband busted buying dope and drug and pill; and the mansion is no cleaner than it was when she began, but she'd slay him if he said so — and he is a prudent man.—*Nebraska State Journal.*

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Cophenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

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JERSEY CITY, N. J., May, 1905.

WHAT A MAN OF SEVENTY YEARS HAS HAD THE OPPORTUNITY TO SEE.

He has seen the invention and development of the telephone, of the telegraph and of the electric light and almost the beginning of the modern railroad system. He has seen the rise of the big ocean liner, the cable system, the wireless system, the Pullman car and the sleeping car.

He could have seen Daniel Webster, Henry Clay, John C. Calhoun, Henry Ward Beecher, Wendell Phillips, Ralph Waldo Emerson and Abraham Lincoln.

During his time the Franco-Prussian war was fought, the American civil war, the Spanish war and the Russo-Japanese war.

In his time Darwin wrote the origin of the species and Herbert Spencer his great philosophy. Also in his time have risen to fame, Tennyson, Browning and Longfellow. In his time the journey to Europe has been brought down from sixty and seventy days to five days and a fraction.

Business was then all individual firms; now it is all mighty combinations.

He has seen the currency change from a system one-half "wild cat" to a system which defies the having of bad bills.

He has seen the Republican party control the national elections since the civil war, every time but two, viz.: nine elections out of eleven.—JOHN A. WALKER.

"SOOTHING COMPOUND."

When we saw these words in big letters, written by the chief engineer of one of the big mills in Massachusetts, we were reminded of our childhood days and soothing syrups.

It so happens, however, that this same engineer applies the words "Soothing Compound" to Dixon's Graphite and adds that he is a graphite crank; that he never goes over any of his engines, machines or boilers, without the trustworthy can of Dixon's Flake Graphite and can of cylinder oil. He finds the mixture a "very soothing compound," which prevents the machinery and himself from getting hot "under the collar." He finds that this "soothing compound" aids all the parts of machinery to which it is applied and saves very much profanity from himself. In fact, as this engineer puts it, Dixon's Flake Graphite and good oil "create a sort of good feeling of fellowship between himself, the men and the machinery; all seem to work better for it."

BUILDING OF GREAT BUSINESS ENTERPRISES.

In a speech by Vice-President Roosevelt he said:

"Never be misled into feeling that the men who have built up the wealth of the commonwealth are its enemies, and not its friends. The men who bring business prosperity, the men who lift up, who give the means to achieve civilization, they are the commonwealth's friends. They do good, and never harm. They can do incalculably more good by using their talents in building up great business enterprises, which benefit all, than they could do with their talent in other ways. But we must remember that the greatest debt we can owe is to those who do no material, but rather moral, service — to the teachers, the soldiers, the statesmen, the public servants, provided only they work not only with disinterestedness, but with sanity and common sense. We need reformers — we have got to have them. But we want them built on the lines of Lincoln. We want men who will fix their eyes on the stars, but who will not forget that their feet must walk on the ground. We want men who will strive for a high ideal, but who will remember that we must achieve the highest ideals by practical methods. Woe to us as a nation if we ever permit our leading men to be base. Woe to us if we tolerate that which deviates from the path of rectitude, of decency and of honesty. Woe also if we do not insist upon having common sense. Sanity and common sense go hand in hand with a pure and lofty ideal. But that is not enough. I do not care how honest a man is, if he is timid, there is little that can be done with him. I do not care how patriotic he is; if in a crisis he is afraid, his patriotism will not do much good.

MICA VS. GRAPHITE.

We have before us a circular advocating the use of mica as a lubricant. We quote as follows from it:

"Mica is far superior to graphite as a lubricant. Mica is alive. Graphite is dead. Mica is not affected by heat. Graphite will cake under heat. Unlike graphite, mica has elasticity, strength, resiliency, and is not affected by heat or cold, moisture or dryness, or atmospheric conditions."

The difference between mica and graphite as a lubricant is as the difference between words and facts.

DIXON'S graphite publications are sent free of charge to all who are interested in the subject of graphite.

THE COMSTOCK LUBRICATOR, FEEDING DIXON'S FLAKE GRAPHITE No. 2.

A new Lubricator with Unique Features. Simple in Construction and Efficient.

The benefits of Dixon's Ticonderoga Flake Graphite in the lubrication of the bearings of engines and machinery are many. Those of importance are these:

1. Seizing or cutting of metal surfaces is absolutely impossible in the presence of a layer of flake graphite.

2. Graphite, renewed from time to time, takes up all wear, preventing abrasion and wear of the parts.

3. Graphite smooths and polishes the surfaces and maintains them in a state of high polish, thereby reducing friction losses to a minimum.

4. If graphite is used in conjunction with the oily lubricant, thinner, and probably cheaper oils will suffice to assure excellent results, and far less oil is required for good results than if no graphite were used.

In order to use graphite for lubrication, engineers have been compelled either to modify their lubricating systems for handling a graphite grease, or to be content to apply a little graphite and oil occasionally, independent of the regular oilers. The reason for this has been the difficulty of permanently suspending the particles of graphite in oil.

Many engineers still prefer oil to grease for general lubrication, and though wide awake to the advantages of graphite lubrication, do not take kindly to grease lubrication.

Letters patent have lately been granted to the Comstock Engine Co., of 49-61 Clymer Street, Brooklyn, for a graphite lubricator designed to fill the want we have shown above, namely, for a simple and effective means of applying small quantities of Dixon's Finely Ground Ticonderoga Flake Graphite, No. 2, with every drop of oil, to engine and machine bearings in an entirely automatic manner.

The following description and accompanying illustrations will make clear to our readers the construction and operation of the Comstock Cup.

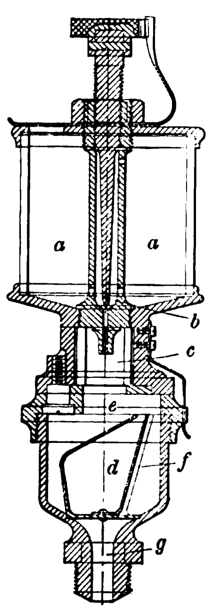


Fig. 1.

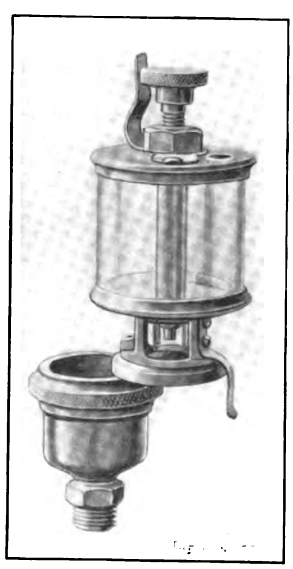


Fig. 2.

a, Reservoir for oil.
b, Valve for regulating flow of oil.
c, Sight feed glass.
d, Receptacle for graphite.
e, Frame for directing flow of oil.
f, Wire cloth screen through which oil and graphite flow.
g, Passage to bearing.

This lubricator consists of a glass reservoir containing the oil, below which is a brass receptacle for graphite through which the oil passes on its way to the part to be lubricated. A section of the lubricator, or cup, is shown in Figure 1.

Referring to this illustration, *a* indicates the reservoir for containing the oil, which is provided with a needle valve, *b*, to regulate the flow of oil. This drops through the sight feed glass *c*, so that the amount used is easily known and controlled. Below this is a receptacle, *d*, which is nearly filled with Dixon's Ticonderoga Flake Graphite, No. 2, or finer size. When the oil drops into the graphite receptacle it falls on the inclined top of a small frame, *e*, and is thus diffussed over the surface of the graphite. The oil thus dropped, after picking up a small quantity of graphite, finally flows through a wire cloth, *f*, attached to the under side of the frame, thence emerging through the passage *g* to the parts to be lubricated. It will be understood that the graphite settles in a compact mass in the cup and the oil does not pass through this mass but washes over it, taking up a little graphite (perhaps 1% or 1½% by weight) which it conveys to the part to be lubricated. The size of the valve permits a close adjustment, so that the flow may be no more than one drop per minute or may be increased as desired. Figure 2 is a view of the lubricator, showing the oil reservoir swung aside to permit access to the receptacle for the graphite.

Tests of this lubricator, which have been made on moving machinery, have given excellent satisfaction. A flow of two drops per minute carried enough graphite to lubricate with complete success the bearing of a propeller shaft 8½ inches in diameter and running at a speed of 128 to 140 revolutions per minute. On a shaft making from 1600 to 2000 revolutions per minute, which had given considerable trouble by running hot, one of these lubricators was placed with the same satisfactory result.

The device is simple in construction, having no complicated moving parts to get out of order. It is easily regulated and when properly adjusted will use no more material, either of oil or graphite, than is needed to do the work required.

It is particularly adapted to the lubrication of heavy bearings or those running at high speed.

The Comstock Engine Co. intend to adapt this lubricator for use both as a gravity cup for all bearings and to work under pressure for steam lubrication. It will be made in four sizes, holding one, two, four and six ounces of oil, respectively.

These "Graphoil" lubricators, as they have been named, are arranged to handle Dixon's Flake Graphite No. 2, or finer size, and the manufacturers wisely recommend the use of this particular graphite.

We have pleasure in commending the Comstock "Graphoil" Lubricators to our friends and refer them to the makers for further particulars.

MAIN STEAM PIPES.

By W. H. Wakeman.

PART I.

Some time ago the engineer of a certain plant went on top of his boilers to turn steam on to one of the main pipes. Water hammer burst the pipe, escaping steam scalded the engineer, making it necessary to take him to a hospital. The damage was repaired at considerable expense, causing delay to the works, another engineer was secured who escaped accident for a time, but one day he carelessly imitated his predecessor, the pipe burst in the same place that the other failed, the engineer was scalded in a similar way and was taken to the same hospital.

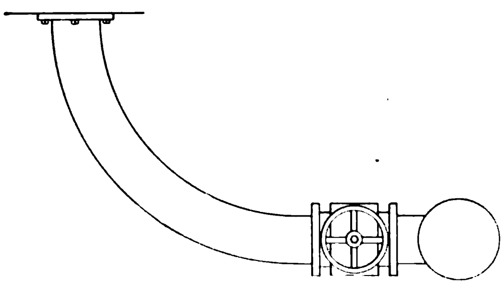


Fig. 1.

After this trouble and expense the owners became convinced that their main steam pipes were not properly arranged, therefore they had this part of their plant remodeled, and have had no further trouble.

As I have had charge of at least two plants where these pipes were very badly arranged, resulting in one case in a ruptured throttle valve, and in the other a dangerous water hammer, the subject has been so strongly impressed upon my mind that it appears to be of vital importance, therefore a few suggestions along this line should be both interesting and profitable.

Figure 1 shows a good design for a main steam pipe connecting one boiler of a battery to the header, or steam drum, common to all. The long bend allows ample chance for expansion and contraction without injury to the pipe, or the joint connecting it to the boiler.

When this form is used, there is no danger of water hammer, as the following will show. Suppose that the valve is shut as the boiler to which it is connected is laid off, while the header is under full pressure from the other boilers. Steam is raised in the idle boiler, and when it reaches the valve it is condensing in the whole pipe, the resulting water flowing back into the boiler. When the pressure is very nearly equal on both sides of this valve, it is opened, thus allowing this boiler to take its share of the work as the fire under it is continued.

This process is called "cutting in" the idle boiler, and where poorly arranged pipes are badly managed, it is dangerous, but with correctly designed piping, well managed, it is perfectly safe.

The practice of ignorant firemen who fill the idle boiler with cold water, then open the stop valve and admit steam to the upper part of this cold boiler, cannot be too strongly condemned, as it results in heavy strains upon the shell, caused by uneven expansion. The valve should never be opened until pressure in the idle boiler is practically identical with that in the header.

A gate valve is frequently used for this service, and it is practically impossible for it to fail when shut and no pressure in the boiler to which it is connected. When a man is going into an idle boiler while others in the same battery are at work, it is a source of satisfaction to know that the stop valve cannot fail and scald him to death.

It always takes several turns of the wheel to open a gate valve, but this is not an altogether bad feature, although it is annoying at times. Where the piping is not well arranged it tends to prevent too rapid admission of steam from one pipe into another, where there is great difference in pressure, owing to improper management of the matter in hand.

The principal objection to a gate valve for this place is that it is difficult to repair when out of order. There is no good reason why a globe valve should not be used here.

Figure 2 shows a good arrangement of piping in which an angle valve is used. There is no chance for water to collect on either side of this valve and cause trouble, as it is drained automatically. Care should be taken when designing a system of piping like this to have the header far enough away to allow for contraction and expansion. Where five or six inch pipe is used the distance from center of header to center of valve should be about ten feet, and if more it will do no harm.

It will be noted that in Figure 2 the valve shuts against the pressure, therefore when this boiler is laid off the valve stem stuffing box can be packed at pleasure. It is not the strongest form of construction, because the threaded valve stem must support the total pressure on the disk. In a case of a six inch valve under 100 pounds pressure this amounts to 2,800 pounds. If we saw a coal cart containing one ton of coal suspended by this valve stem, it would give a better idea of the load carried than to look at it while under pressure. Failure of a valve stem here would undoubtedly cause much trouble, but they very seldom fail in practice.

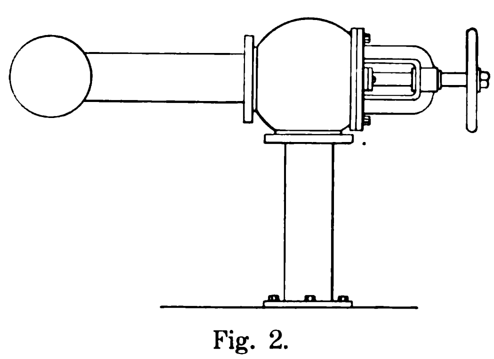


Fig. 2.

The ceiling of many boiler rooms is so low that there is not enough head room to allow proper arrangement of piping and fixtures, therefore it is necessary to place the stop valves as shown, as otherwise they could not be opened and closed.

So far as operating the valve is concerned this is the best arrangement, because all lost motion between the stem and the disk is automatically taken up by pressure.

Figure 3 shows the same arrangement of piping, but the position of stop-valve is reversed, bringing the stem into a vertical position. When this boiler is laid off, pressure from the header comes on top of the disk, making a very strong form of construction, as it is practically impossible for the valve to fail and allow steam to blow into the idle boiler.

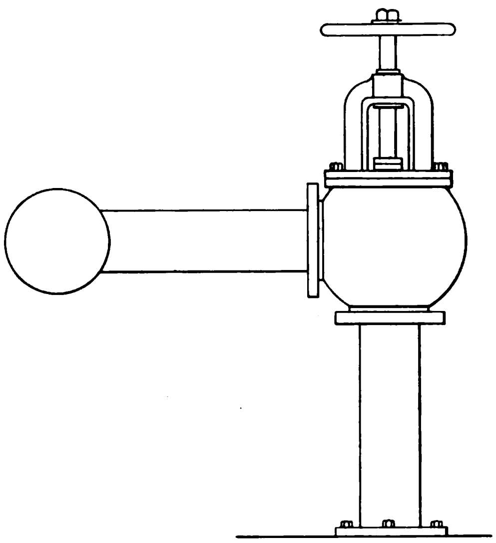


Fig. 3.

However, when this valve stem must be packed it is necessary to remove pressure from the header, as otherwise steam will blow out around the stem. Where several other boilers discharge into the same header, it may not be convenient to shut them all off, especially where the plant is run night and day.

I do not wish to make this matter of packing valve stems appear more important than it really is, but still it is one of those details in the management of a steam plant that goes far towards giving the engineer a good or a bad reputation, as the case may be. Philosophers sometimes claim that it matters little what our reputation is, so long as our character is good, and to this sentiment the writer gives hearty approval. I wish to add, however, that as a rule (to which there are very few exceptions) the reputation of an engineer so far as caring for his plant is concerned, is a true indication of his character in this respect. This of course does not refer to what a possible rival may say of him, but to his real reputation. This is the result of my observation for a long time.

If asbestos wicking is formed into a rope of suitable size for the stuffing box of a valve stem, then coated with graphite mixed with cylinder oil to the consistency of thick paste, it will last well and give satisfaction on steam valves. This is also the result of my observation for a long time. At first the graphite will color the valve stem, but it is easily cleaned if attended to within a reasonable time.

It is poor policy to neglect valve stems until the glands are screwed down as far as possible, then have a jet of steam about two feet long escape around the stem every time that the wheel is turned. It is much better to pack all such stems at stated intervals, thus keeping them in good order, taking care to remove all old packing before putting in new.

Figure 4 illustrates one of the worst forms of main steam pipes that has ever been devised. It allows for contraction and expansion perfectly, and the valve is lower than the header, thus affording ample room in which to handle and care for the valves, but this is all that can be said in its favor.

When this boiler is laid off, water collects in both horizontal and vertical pieces of pipe shown, also in the valve bonnet. As the joints are alternately heated and cooled, it is difficult to keep them tight.

When the small drip valve is opened, water hammer is the inevitable result, and if the main stop valve is opened before this water is disposed of, an accident is almost sure to result. The alternative is to keep this drip valve open at all times, whether the boiler is idle or at work. To prevent waste of heat, this drip pipe may be connected to the feed pipe of boiler, inside of all other valves, but care must be taken to locate a swing check valve in this pipe to prevent water from being forced upward into the steam pipe and thence carried to the engine.

Water will always stand in such a drip pipe as high as the boiler water level, and enough higher to open the check valve. If the feed pipe is partly closed by scale, where it discharges into the boiler, the friction caused by the obstruction may be sufficient to create more pressure than exists in the main steam pipe, consequently the check valve above mentioned will be kept closed and water will accumulate.

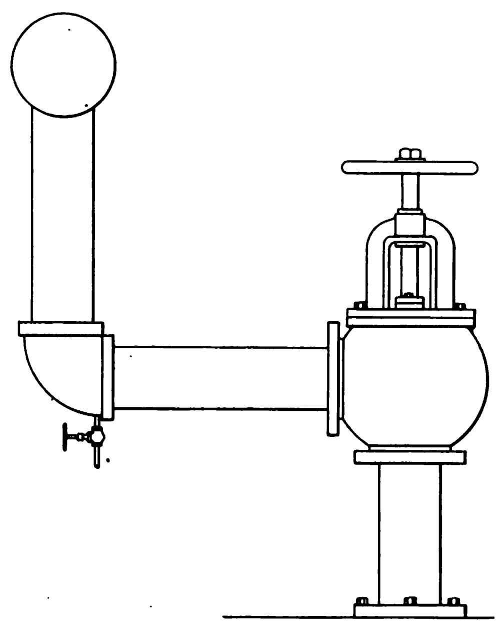


Fig. 4.

On this account it is a good plan to connect a pressure gauge to the feed pipe and locate it where its indications can always be readily seen by the engineer. If it exceeds the steam pressure carried, the cause should be determined without delay and a remedy applied.

(To be continued.)

THE BLUE PENCIL.

Especially Dixon's "Best" Blue Pencil.

The blue pencil is mightier than the sword; it is stronger than the hand that rocks the cradle; it rules the world. The ideal blue pencil, in the opening days of the twentieth century, leaves the copy full of heart interest; of details of human action, the knowledge of which betters mankind. It is iconoclastic with the powers of evil; it gives humanity something to live up to; renders justice where justice is due, praise when praise is due; blame when blame is due. It is faithful, honest and conscientious. It bears the burden of woe under which the children of God groan and alleviates the woe through competent conception of conditions which makes for that woe. It comprehends the good developed in the struggle for existence and recognizes in the good that divine element which makes all men brothers, and the golden rule the obvious measure of action in the conduct of men.

The editorial conscience is the only guide back of the blue pencil. The ideal editorial conscience exists in the heart of each one of us; it is as varied as the individual, as changeable as the light of the morning sun. It was one thing to-day; it was different yesterday; 'twill be gone tomorrow. It is the chameleon that changes with public opinion, and yet is always in advance of that same public opinion.

"The newspaper has no friends, and no enemies," said a member of the fraternity to me once, shortly after I left school. "You are to be commiserated on your lack of friends; but how do you escape your enemies?" was the reply, and I have been studying his chance remark ever since. Friends are a necessity to our daily life; their love and counsel are our daily tonic. Yet these same friends are often the greatest problem in the editorial policy of the paper. To be just to friends we are unjust to others; to be conscious of enemies is a great trial to the judicial editorial conscience, and to render justice when intolerance and unkindness only have been shown, is the keenest test of the power of the blue pencil. The temptation to pay back, in service and return, often cause the ideal blue pencil to wabble away from the straight and ideal path of rectitude and turn the loud sum of the unit into diminished quantity. To grow out of a creed or dogma is the greatest test of human character. The editor who is pronounced in a creed cannot keep the blue pencil straight; the one who is a religionist that does not cover all religion, lets it sway in his fingers. He who believes in more than the Apostles' Creed is likely to yield an allegiance that deprives others of their due; he who goes beyond the ten commandments for a rule of action may find all vice unredeemed, all crime, the vileness of the heart, and render in all verdicts a maximum sentence. He whose life is all recreation fails to understand the sternness of the moralist; he who has no purpose does not realize the sacrifice of a thirty-five years' struggle for a principle.

He, who is a man, cannot speak for women and their needs.

The Republican cannot portray faithfully the truths of the Democratic party. The Methodist cannot rise to the idealism of Catholicism; the Prohibitionist can see no right outside of the fluttering white ribbon. Elbert Hubbard raves at the vulgarity of the age, himself supremely vulgar; he does not enter into the sensitized stage of life which he does not see. The spiritual lives in one world, the physical in another, the intellectual in yet another. The editor must be all of these if he would render all justice. Religion, politics, temperament-morality spiritually he cannot have as a creed or dogma, should he rise to the absolute judicial power which makes for that ideal editorial conscience. If he is evil, he hates evil too furiously because of the evil in himself; if he is good he has no limitations, hates nothing, loves nothing, is a balanced ego, great in all things and nothing in none.

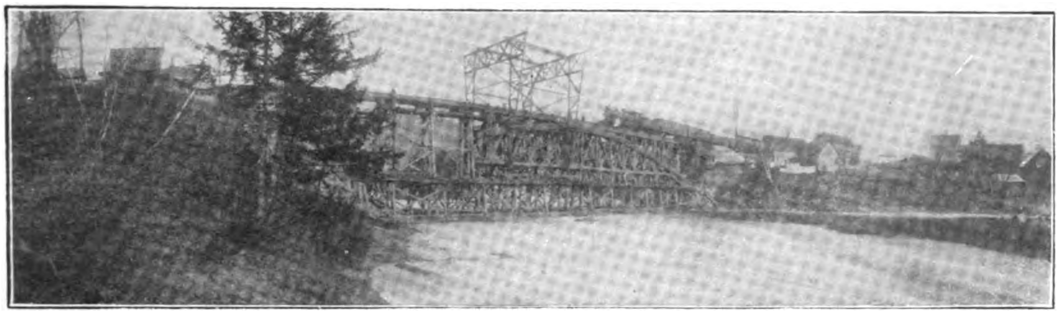
"I'm not so sure, but that I believe every city should have a sensational daily" (absurd term), said a man recently in speaking of the blue pencil in its ideal relation. The statement precipitated, of course, the discussion of the moral right the community has to know what others are doing, the extent any good may come of this knowledge and ultimately the responsibility of the blue pencil.

There is no fact of daily life that cannot be inoffensively stated; there is no fact of human nature that is not known to exist, but what place it should have in *your* daily life and *mine* is something to settle with your editor. When these facts cause moral debility, mental dyspepsia, when they degrade the susceptibilities and harden the soul by familiarity, the corrective influence is to cease where my right to be protected begins. If tales of human suffering find no expression upon their narration, I am the worse for reading of them. If there is a tendency to evil in my heart, I cannot withstand the suggestion of evil which passes under the blue pencil. If I am a liar, and I read of a successful lie, it makes for further lying. If I am a thief and I read of successful thieving, I am again a thief. If I am guilty of malice and all uncharitableness, I am malicious and uncharitable as I receive it by suggestion from the public press. If I am sensational, unbalanced, irresponsible, I become the more so as I find the world reproduces in its daily life the worst that is in me. In its possession by others I find my own justification. I become drunk because others are drunk; I go mad because others are mad; I am vicious because others are vicious; I am respectable because others are respectable; I am religious because others are religious. The rare will who makes himself does not need an editor's blue pencil. The rarer will back of the average blue pencil makes the evil that exists more evil, the good more good; he makes for truth, honesty, and knowledge; he produces liars, thieves and ignorance.

The ideal blue pencil is beyond me; I cannot see it, I cannot imagine it. It rises to the height of Sinai and rests in the shadow of Gethsemane. It is bedewed with the tears of Lazarus and shines with reflecting the gates of pearls and the walls of precious stones; it is the hope of the penitent Magdalene and the despair of the hardened Pharisees; it is the ultimate justice for which the soul yearns. Struggling humanity, starving, disheartened, threatening, cries out, "Give it to me," and human nature, blind, wearied and discouraged, says, reluctantly, "It is not with me."—*Miss Florence Blackford in National-Printer-Journalist.*

WHO'S OUT THE DOLLAR?

A man wanted a ticket to Olathe and only had a two dollar bill. It required three dollars to get the ticket. He took the two dollar bill to a pawn shop, pawned it for $1.50. On his way back to the depot he met a friend to whom he sold the pawn ticket for $1.50. That gave him the $3.00. Now, who's out the dollar?—*Kansas City Star.*



WOODSVILLE RAILROAD AND HIGHWAY BRIDGE.

The new Woodsville Bridge of the Boston & Maine Railroad carries a single track and a highway across the Connecticut River, connecting the villages of Woodsville, N. H., and Wells River, Vt. It crosses the channel at a narrow point with a single span of 239 feet. The bridge is especially interesting on account of its details, because it is the sixth structure which has been built at this point and because it was the first bridge from the mouth crossing the river with a single span. The railroad track is about 45 feet above water level and the water is from 22 to 40 feet deep.

The bridge was designed and its construction directed by the Engineering Department of the Boston & Maine Railroad, Mr. H. Bissell, Chief Engineer, and Mr. J. P. Snow, Bridge Engineer. Mr. John W. Storrs, Assistant Engineer, was in charge of erection and inspection. The American Bridge Company was the contractor for the superstructure and Messrs. Ellis & Buswell, of Woburn, Mass., were the contractors for the substructure.

The bridge is protected from corrosion with Dixon's Silica-Graphite Paint, Natural Color.

CURIOUS LETTERS.

Each day brings us at least one curious letter, but some letters are more curious than others. Within the last month we have received some very curious ones, and among them are the following :—

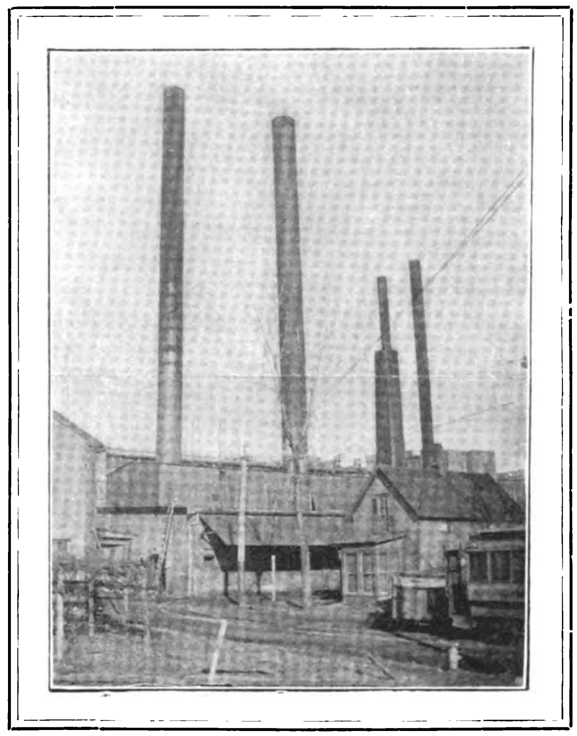
The first is addressed, "Joseph Dixon & Weed, New York, America." It comes to us from Tasmania. The writer had seen our advertisement and asks for a sample of Dixon's "Eterno" pencil, also copy of Dixon's Pencil Guide, and he would like us to send him some old postage stamps and an almanac. He tells us that his town is a silver-mining camp, that he has lived there over fifteen years, is paralyzed on his right side, but walks about with the use of a stick. He states that Mt. Tyell is called the largest copper field in the world and is nineteen miles from his place. He takes it for granted that Joseph Dixon is still alive and up and doing business and adds, "Good bye, Sir! Wishing you and your family a Merry Christmas and a Happy New Year—Good Bye."

Another letter comes to us from Rangoon. The writer feels "obliged to ask you to send me letter or guide book on Health from your shop, also kindly let me know if you have any almanacks about the age of birds and animals from their birth to their oldest age they live. In case you haven't it, kindly recommend me to any other firm who has them and oblige, Yours faithfully,

———"

ONE UNPARDONABLE THING.

There are certain unpardonable sins in every sphere of life. One unpardonable sin of the travelling man is to send in to his house letters and memos. which, from the hand writing point of view, are hard to read. If a memo. or letter has enough importance to be sent in at all, it should be sent in in legible hand writing, so that it can be read both easily and hurriedly. Where one's correspondence runs up to 500 or 600 letters a day, the mere reading of the manuscript is a tax on strength and on one's eyes, and everything of this kind should be made as legible as possible.—JOHN A. WALKER.



ROBERT HOLMES & BROS., INC., MACHINISTS.

DANVILLE, Ill., Dec. 7, 1904.

Joseph Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN:—Replying to your valued favor of the 3rd inst., in reference to the Traction Company's stacks in our city. They have two seven-foot stacks, each 150 feet high, close together, and they were both painted last spring, one being painted with Dixon's Silica-Graphite Paint and the other with ——— ——— stack paint.

Dixon's paint seems to be in perfect shape to-day, while the other stack is bare. Respectfully yours,

ROBERT HOLMES & BROS., INC.

THE PAINTER'S VACATION.

Casey—"Did ye take a vacation this year, Mike?"

Corrigan—"Oi did not. Oi was out on strike from May to October.—*Puck*.

DIXON'S PASTELS.

What a Well-Known Supervisor of Drawing Has to Say About Them.

As a sample of the high opinion that supervisors of drawing have of Dixon's Pastels, we quote the following from a letter sent by Miss Katherine H. Law, supervisor of drawing, Flint, Mich., to the Chicago office of the Dixon Company.

"We are all very much delighted with the Pastels, and I feel our pupils have been quite successful in using them. I am sure that the work with them is so satisfactory that larger orders will follow this introduction. The colors are uniformly excellent and certainly merit all that can be said in their favor."

Miss Law's work speaks for itself, ranking her among the most able supervisors in the State of Michigan.

THE durability of an oil is governed by its boiling point. No degree of heat attainable in a bearing or cylinder can affect the efficiency and endurance of a coating of Dixon's Flake Graphite, and it makes possible a duty that the best oils alone have failed to provide.

It may be fed either mixed with oil, or grease, or dry, according to the case, but should always be fed in small percentages.

DIXON's Pure Flake Graphite affords at once the cheapest and the most perfect means of lubrication. It may be used dry or mixed with oil or grease, or even water, as the duty may demand.

It never fails to cure groans and stiffness in valves and cylinders. Abrasion cannot occur in its presence, and reduced friction and oil consumption follow unfailingly.

DIXON'S

THE AUTOIST WHO HASN'T TRIED DIXON'S SPECIAL GRAPHITE No. 635
in his engine cylinder and Dixon's Graphite Greases on his gears and bearings has a revelation in store for him.
Send for *"Graphite for the Motor,"* try graphite on your car, and learn how much "better lubrication" really means.

GRAPHITE
MOTOR LUBRICANTS.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Felt Erasive Rubber, for erasing pencil marks, typewriter work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake or bulk form.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, better and cleaner than castor oil for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite.

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Motor Chain Compound, for perfectly lubricating transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for preserving leather belts and to prevent slipping.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

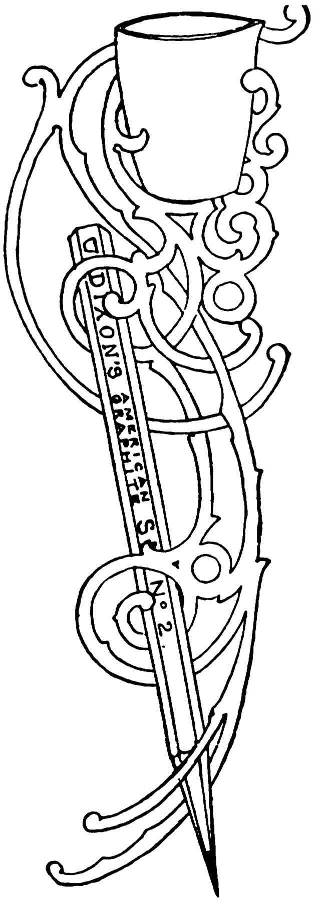
Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

Graphite

VOL. VII. JUNE, 1905. No. 6.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



WANDERLUST.

Beyond the east the sunrise, beyond the west the sea,
And east and west the wanderlust that will not let me be;
It works in me like madness, dear, to bid me say good-by!
For the seas call and the stars call, and oh! the call of the sky!

I know not where the white road runs, nor what the blue hills are,
But a man can have the sun for friend, and for his guide a star;
And there's no end of voyaging when once the voice is heard,
For the river calls and the road calls, and oh! the call of a bird!

Yonder the long horizon lies, and there by night and day
The old ships draw to home again, the young ships sail away;
And come I may, but go I must, and if men ask you why,
You may put the blame on the stars and the sun and the white road and the sky!

—GERALD GOULD in *Spectator*.

DIXON'S GRAPHITE AXLE GREASE.

Orders for Dixon's Axle Grease are Largely on the Increase. Many Orders are Accompanied by Testimonials.

For the past few months, the sales of Dixon's Graphite Axle Grease have increased greatly and this without any special effort in the way of advertising. Not only large consumers, like express companies, brewers, trucking companies and others, are ordering it, but dealers are also placing their orders for the smaller packages, as the user of the light carriage seems to find it equally useful.

An order comes in to us from Kingston, N. Y., for five gross of the one-pound packages and the dealer adds: "We are getting along fine with it."

Other dealers are asking that we send them some small samples for distribution, and some circulars descriptive of the wonderful qualities of Dixon's Graphite Axle Grease.

A dealer in coal and wood in Passaic, N. J., says:

"I have tried the sample of Graphite Grease on one of my heavy coal wagons and it seems a very good article. I would like you to send me as soon as possible one 25-lb. pail and I will continue to use it, if it is as sample."

GRAPHITE COMMUTATOR BRUSHES.

An Exhaustive Test That Proved Most Satisfactory.

Sometime ago a very exhaustive test was made by an electrician to determine the value of Dixon's Graphite Commutator Brushes.

A set was installed on an eight horse power motor; speed 577 revolutions, which was one of the motors on the supply for the ventilating system,

The motor ran continuously on a 24-hour circuit for 2544 hours.

During the trial, no cleaning of any kind was done about the commutator or brushes.

When the motor was shut down after the trial, a careful examination was made.

No copper dust was found, showing that there had been no cutting of the commutator.

The commutator had become smooth as glass, and of a beautiful brown color.

There was no sparking, and so smoothly did the commutator run that the eye was readily deceived into believing that it was not in motion.

After the brushes were perfectly fitted to the commutator, the motor ran absolutely noiseless which, in this particular case, was a result especially desirable.

It was estimated that these brushes reduced fully seventy-five per cent. of the work necessary for the successful operation of the motor.

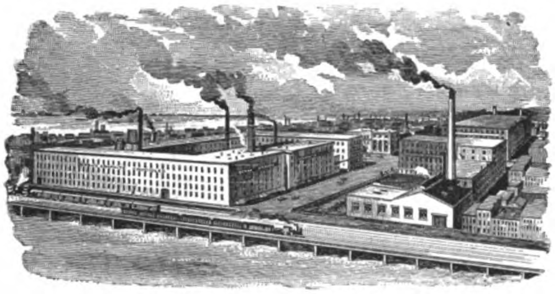
The electrician, who is a chief electrician in an important department of the United States Government and whose name we are not at liberty to make public, stated that he would be pleased to have such brushes on all the motors in his department.

We would say that they were installed and that it was with pleasure that he congratulated the Dixon Company on its success in the manufacture of these brushes, for "without a doubt they are the best commutator brushes I have used in fifteen years."

VISCOSITY, often called "body" or "thickness" of an oil, is that quality which enables it to resist pressures. This viscosity is always at the cost of friction in the oil itself. The presence of even a little of Dixon's pure flake graphite in every bearing, in every cylinder and valve, will enable the engineers to use thinner oil, making a double reduction in the friction loads.

DIXON'S graphite publications are sent free of charge to all who are interested in the subject of graphite.

ESTABLISHED 1827. **INCORPORATED 1868.**



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Cophenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* **JOHN A. WALKER,** *Vice Pres. and Treas.* **GEO. E. LONG,** *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., June, 1905.

STOP "HOLLERING."

Mr. Harold Bolce, in an article entitled "How to Build Up Foreign Trade," published in "*The Booklover's Magazine*," tells us that there has been much boasting because of our exports of manufactures in 1904 exceeding all past records. He tells us that the increase was largely in mineral oil, copper, iron and steel; that exports of cotton were greater in value but less in volume than before, but that, as a matter of record, officially published, our total exports declined.

He tells us in what countries they fell off and the amounts, and adds that the United States has encountered overwhelming trade defeats in South America and in some other countries. That we may not think him prejudiced, he reminds us that the record is plain and is printed every month by the Government at Washington. He reminds the business men of America of the value and necessity of securing South American, Oceanican and Asiatic markets. While all Asia was calling for cotton, the Egyptian raw supply ran short. The mills of Lancaster, and other manufacturing centers in the old world, laid off hundreds of workmen.

Then came the news of abundant crops in America and the cotton mill men of England were informed that factories were ready to resume. With this opportunity offered America we displayed the incredible folly of burning cotton to force up the price.

Great stress is laid upon the value the Panama Canal will be in promoting American trade. It is confidentially predicted that through the Panama Canal, America is to sail its ships and cargoes triumphantly to all the markets of the Pacific. Inquiry into our trade status on the Atlantic side of South America, forces the conclusion that the digging of the canal will not, in itself, secure to the United States the trade of the Western Republics of South America or of the farther Pacific countries. It will cause astonishment to many to learn that our failure to get trade on the Atlantic side of South America is even greater than on the western coast. Brazil, for example, credits us with only 9.85% of its imports, while Chile credits us with 10.87%. In the trade of both Republics, our share is, of course, pitiable; but the significant thing in the promised Panama Canal is that in Brazil, to which we have direct ocean access to all manufacturing centers, we have been beaten worse than in Chile on the other side of the Southern Continent. Moreover, our exports to Brazil have been steadily decreasing, while our exports to Chile have been slowly increasing. Ten years ago our exports to Brazil were greater than they are now. Ocean waterway alone will not bring trade to the United States. To many, our sole salvation lies in building up an American merchant marine by generous Government aid. It is urged with much force that it is ridiculous for a nation to aspire to commercial supremacy, when 97% of its own foreign trade is carried in foreign ships.

It is high time to stop boasting and to make a careful study of the demands of foreign countries and then, if we have the goods which they need and can meet prices and can agree to credit conditions, to send the goods in our own vessels.

In other words, to stop hollering about what we think we are doing and to find out just what we are doing, and what we are not doing, and act accordingly.

THE ART OF RESTING.

To understand how to rest is of more importance than to know how to work. The latter can be learned easily; the former it takes years to learn, and some people never learn the art of resting. It is simply a change of scenes and activities. Loafing may not be resting. Sleeping is not always resting. Sitting down for days with nothing to do is not restful. A change is needed to bring into play a different set of faculties and to turn the life into a new channel. The man who works hard finds his best rest in playing hard. The man burdened with care finds relief in something that is active, yet free from responsibility.—*American Analyst.*

THE RETORT COURTEOUS—IN TEXAS.

"Should idiots be killed at birth?" asks a curious clergyman. Sometimes you don't find out till they are grown up and get to asking fool questions.—Houston (Texas) *Chronicle.*

He is indeed a "curious" clergyman who asks that question and is entitled to the courteous answer of the sprightly *Chronicle.—N. Y. Herald.*

"What power can give more than food and drink,
To live at ease and not be bound to think."

—*Dryden Medal.*

A SCALE CATCHER.

A direct-acting steam pump made by a reputable firm began to run slower and slower, until it would not do the required work with full pressure of steam allowed and throttle valve wide open, although it had been used but a few months. The manufacturers were notified that their pump was not satisfactory, and requested to replace it at once.

A representative of the firm came, bringing with him a duplicate steam chest complete with valve, etc. The old one was removed, and the surfaces were found so badly cut and scored by scale from the inner surface of steam pipe, red lead and dirt that steam passed to both sides of the piston, thus preventing it from moving. It was one of those pumps on which there is no mechanical connection between the main valve and the piston. The old steam chest was removed and another put on. Packing in the steam pipe union was removed and replaced by a lead gasket, carrying a cup-shaped wire gauze strainer (Fig 1). The engineer was instructed to clean this strainer whenever the pump began to run slow, and carefully put it back in place. In about two weeks it was necessary to do this, when the strainer was found nearly full of iron scale that would cut iron and brass about equal to emery. After this was removed and the clean strainer put in the union again, the pump would run at full speed. This occurred several months ago, and since then it has been necessary to clean the strainer about once a week, and considerable scale and dirt was found each time.

It is necessary to make the strainer cup-shaped in order to provide sufficient area of opening for the steam to pass, as otherwise even a clean strainer would prove objectionable and but a small amount of foreign matter would stop the pump. When made in this form, the area of openings about equals the cross-section of the pipe

This scale catcher lasted well, but when worn out it was not convenient to make another like it, hence a larger union was substituted which permitted the use of a flat strainer, as shown in Fig. 2. The increased area thus provided is equal to that shown in Fig. 1.

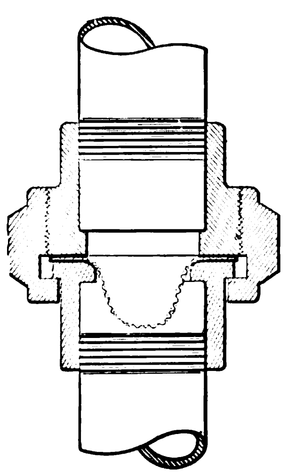


FIG. 1

A piece of wire gauze, such as dairymen use for straining milk, answers this purpose well, as it is fine enough to catch all objectionable matter. It may be cut into circular form with a pair of ordinary shears. A gasket cut from thin sheet packings is put on each side of it, the heat and pressure soon forming them into one solid piece, which may be removed at pleasure without injury, provided both sides of it are coated with graphite. The male part of union should be filed until it presents a flat surface, as otherwise it will cut the strainer.

In another case an engineer found that it required more and more opening at the throttle valve to run his pump full speed, although the steam and water valves were all in good order, also the piston and cylinder. One day he took the union in his steam pipe apart and found a strainer in it as above described. It was clogged with iron scale, red lead, etc., so that but little steam could get through it, which explained the unsatisfactory action of his pump. He threw the strainer away, thus allowing all foreign matter to go into the steam chest, and now boasts of having removed an obstacle that the pump makers ignorantly put in his way. As the steam valves of his pump are driven by the cross-heads through mechanical connections, the pistons will continue to deliver water even if the steam valves and cylinder are badly scored, but he had better have retained the strainer and kept it clear.

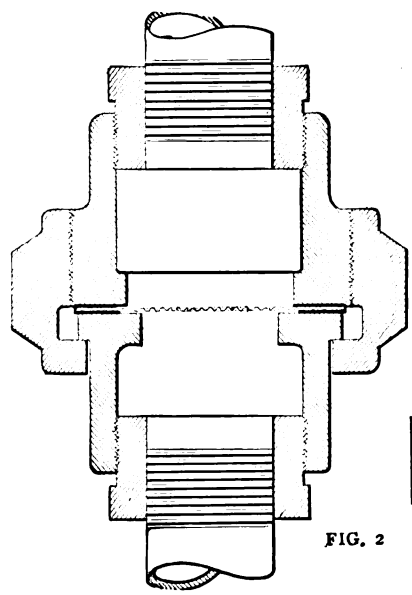


FIG. 2

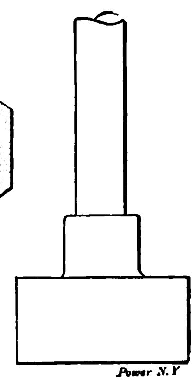


FIG. 3

A fine strainer put on the end of the suction pipe of an air compressor will prevent foreign matter from being drawn in. It should be soldered over the end of a reducing coupling (Fig. 3), thus offering a large surface to the incoming air, so that the perforations will exceed the cross-section of pipe, preventing a reduction of air supply from this cause.

If the pipe is long, a union should be provided near the compressor, that is fitted with a strainer as above described, to prevent iron scale from injuring the air piston and valves.

Whenever a union is used in a vertical pipe, the threaded or female part should be on the upper side, as shown in Figs. 1 and 2, so that when the nut is unscrewed it will drop down out of the way.—W. H. WAKEMAN, in *Power*.

Veterans' Home, Napa Co., Cal., Aug. 30, 1903.

Your excellent pencil, 'Eterno,' is all one could desire. Accept my thanks and congratulations.

E. E. Elliott.

DIXON'S publications are sent free to all who need them.

MAIN STEAM PIPES.

By W. H Wakeman.

Part II.

Fig. 5 is the same as Fig. 4, except that the bonnet of valve is removed for repairs. This illustrates the steam pipe and stop valve on one of my boilers. The valve began to leak one day while the boiler was laid off, with pressure still on the header, and it could not be made tight by blowing steam through it and then closing it tightly.

Pressure was removed from the header as soon as possible, the nuts holding bonnet taken off and the wheel was then turned so as to close the valve, thus bringing a leverage to bear on the bonnet, lifting it easily from its seat.

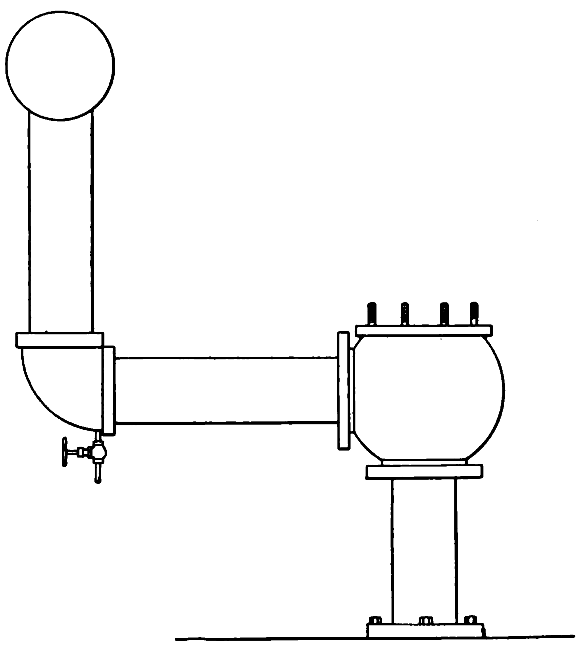


Fig. 5.

Now the packing used for this bonnet adheres tenaciously to iron surfaces that are subjected to steam heat, unless precautions are taken to prevent it. I fancy that some reader will say that the stronger it holds such surfaces together the better it is for all concerned, but this is not always true.

For illustration take the flange joints joining the main steam pipes of these boilers to the shells. They were packed more than ten years ago with Rainbow packing, and have never leaked. These are what may be called "permanent joints," because it is not necessary to break them to make repairs.

Here it is perfectly proper for packing to hold fast, but where a joint must be broken to make repairs we have a very different proposition to deal with. For example, take the case illustrated in Fig. 5. There are two ways in which to pack such a joint. One of them consists of using a gasket cut to fit inside of the studs shown, while the other calls for covering the whole surface with packing, cutting holes for the studs. Where the former is adopted, great care must be taken to screw the nuts down evenly, as otherwise the packing may blow out before it has resisted pressure for an hour. Where the latter is used it is difficult to make a bad joint, provided the nuts are all screwed down tightly, even if no special care is taken to bring them down evenly, because the entire surface of bonnet is well supported by packing. For these valves the latter plan was considered best and adopted accordingly.

Having decided this point, the next to be considered by the engineer is how to arrange matters so that the bonnet can be easily removed when repairs to the valve are necessary. This is accomplished by leaving the lower side of gasket just as it came from the store, as that will cause it to adhere firmly to the iron when heat is applied. The upper is covered with graphite mixed with cylinder oil, which prevents it from becoming fastened to the iron, therefore the bonnet is easily removed at any time without destroying the gasket.

Fig. 6 shows the bonnet after removal from the body of valve, and an explanation of the necessity for taking it off will doubtless contain points of interest. It is fitted with a Jenkins hard rubber disk which makes a perfectly tight joint, but it must be renewed occasionally.

Fig. 7 shows one of these disks as made ready for use. It will be noted that it is not round on the inner surface, and the nut which holds it in place fits into it nicely as it is made to correspond. The object of this design is to lock the nut and disk together, so that when the disk is worn out it may be removed by unscrewing the nut.

While I am an earnest advocate of Jenkins valves, I do not approve of this form of disk, for the following reasons. In this case, while the nut was being screwed down tightly into place, it was not free to turn independently of the disk, consequently it acted as a sort of wedge, and difference in the expansion of the two metals would crack the disk long before it was worn out.

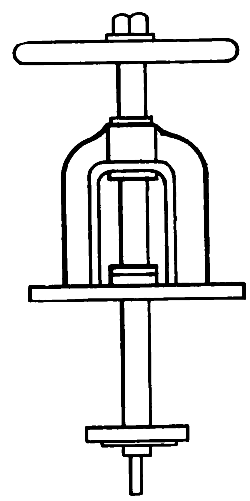


Fig. 6.

Now the hexagon part of the nut, where a wrench must be applied to unscrew it, is much less in diameter than the disk, consequently the wrench would round off the corners of the nut, although a large and strong specimen was used for this purpose to prevent "springing" when force was applied to the handle. When put in a vice and a twenty-four inch Stilson wrench applied, it came off at once, but such treatment is not recommended where it can be avoided.

I give these results just as found in practice, but am pleased to state that the remedy is very simple. It consists in filing the inner surface of disk until it appears as shown in Fig. 8. This prevents the objectionable locking action and leaves the nut free to come off without bringing the disk

with it. This is a better way because the disk becomes firmly attached to the metal underneath, consequently the large surface holds it so firmly that it is difficult to remove it, as already described.

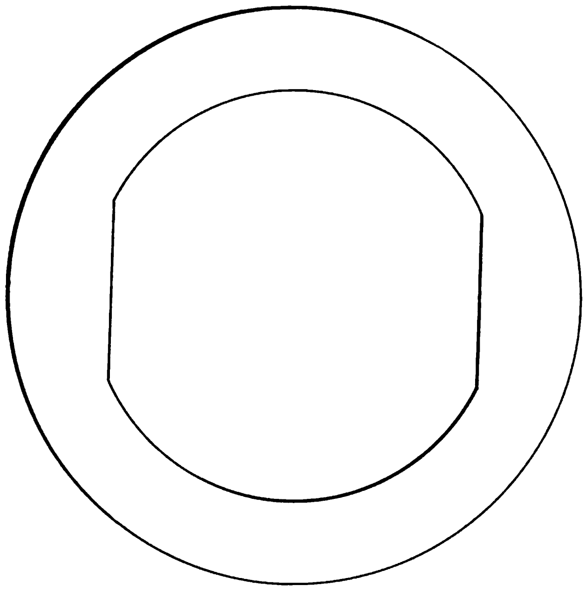


FIG. 7.

There is no reason why the disk should become so firmly fastened to the metal, because it is encircled and held in place by a brass rim, therefore if the surfaces are carefully covered with the mixture of graphite before mentioned it will prevent sticking, and enable the engineer to easily remove a worn out disk.

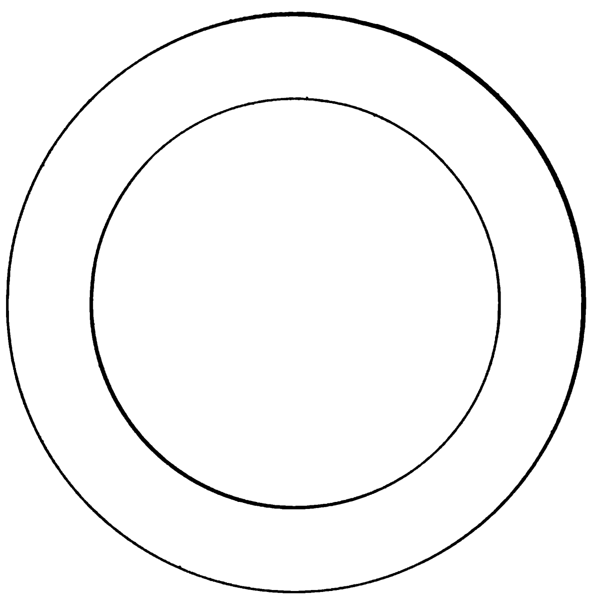


FIG. 8

As a general rule it matters little whether a disk comes out hard or easy, but sometimes it is very convenient to remove one whole. Suppose that while making repairs the engineer of a plant discovers that a six or eight inch disk is worn out and soon afterwards finds out that he has none on hand to replace it. If a supply store is near by and it is open, there may be no trouble in securing another disk, but circumstances are not always favorable. Repairs to steam plants are frequently made at night, on Sundays or holidays, when stores are closed and clerks are enjoying themselves.

Of course it is well to keep a full assortment of supplies in stock, but this is not always done. The engineer may be to blame for the deficiency; or he may not. As this point has no bearing on the case on hand, it will not be discussed here. If a new disk is not available, the next best thing is to have the old one so treated that it can be taken out whole, turned over, replaced and put into service again, making a perfectly tight valve.

On a certain occasion I attempted to remove a disk, but it could not be taken out whole. It was Sunday, and another disk was not at hand. A clerk in a supply store about a mile distant was found, and he kindly consented to get the required disk. Although this is a large store, usually well stocked, there was not a disk of that size on hand. A search was made for a new valve in order to take the disk out of it for immediate use. Other valves were very much in evidence, but not one of the right size could be found, therefore after wasting several hours it was necessary to put the old disk back and let the valve leak until another was secured, and it was of course necessary to take the valve apart again and put the new disk in place. It was not a special size, but only an ordinary four inch valve.

After the required six inch disk was put in place on the valve stem shown in Fig. 6, the bonnet was replaced and the old gasket made a perfectly tight joint. It is well to put on a new coat of graphite in every case before replacing the valve bonnet, or any other part of machinery that has been removed.

There is before me as I write, a six inch second-hand Jenkins disk. It shows signs of wear, that caused it to be taken out of the valve to which it belonged. It is marked "six years," signifying that it was used on the stop valve shown in Fig. 5 for six years. This shows that it proved durable, and when it was replaced by a new one the valve was perfectly tight again. This and other experiences constitute very good reasons for favoring these valves, for use under ordinary conditions.

DIXON'S "ETERNO" PENCIL.

Adds to the Value and Beauty of the Diamond.

"That diamond has been painted," said an expert who was examining a gem offered to him.

"Painted!" exclaimed the owner. "How on earth can they paint a diamond?"

"Well, you see, this stone has all the appearance of a fine blue. The blue is all there." Then he washed it in a little alcohol. When he showed the stone again it was yellow and unattractive.

To paint a stone, and it is done nowadays because diamonds, particularly the fine ones, are so expensive, take an indelible pencil, wet it and rub it on the under part of the stone. The coloring of the pencil gives just enough tinge to make any common stone look fine. The only thing that will remove the coloring is alcohol.

"UPSIDE DOWN."

The attention of the readers of GRAPHITE is called to Figure 1, page 502 of May GRAPHITE. By error of the printer the cut was put in upside down.

DIXON'S graphite publications sent upon request.

A PLEASING STORY.

And a Moral Not Difficult to Find.

"Tom, get a wrench and take out this plug; something is wrong with the trap, and the returns are full of water. The presses upstairs are all getting cold. It is lucky that we put that tee in there for just such a chance as this."

Tom got his wrench and, putting it on the plug, applied his strength with all his might, but the plug never moved, for it had been put in with red lead. Then he rapped it as hard as he dared with his hammer and applied the wrench again, but without success.

The superintendent got on the end of the wrench with him and succeeded only in springing the handle. A piece of pipe to fit over the handle to make it longer was the next play, and that succeeded in breaking the wrench. A second wrench met the same fate.

"Well, Tom, I guess you'll have to smash it. Have you another tee?"

Tom found that the only tee left had a bad sand hole in it and so was useless. It would take an hour to go up-town to get another, and as it was then three o'clock, the pressmen were sent home for the rest of the day.

Then Tom spoke up.

"Mr. Henry, do you remember that 'ad' I showed you some time ago about Dixon's Graphite Joint Compound? They claim that joints made with it are always tight, and yet can be taken apart without breaking the fittings. Bill Conover, down at the power plant, uses it and says it is all right. Hadn't you better let Jimmie get five or ten pounds of it when he goes for the tee"?

"All right, he can get a package and we will try it. I hope it will do what they claim for it, and, if we ever have to take that plug out, we won't have this trouble over again."

That superintendent may rest assured that when that plug has been put in with Dixon's Graphite Pipe Joint Compound it may be easily removed five, ten or twenty years after, and also that during that time the joint will be absolutely tight. When he does remove it he will find the surface as bright and clean as it was when it was put in.

Dixon's Graphite Pipe Joint Compound has been on the market now more than twenty years and in that time has fully demonstrated its tremendous superiority over red lead for the purpose intended.

The reason for this superiority lies in the fact that graphite is a lubricant, and it does not form with the oil a hard, brittle compound as red lead does. When Dixon's Pipe Joint Compound is used, each joint may be made up on an average of half a turn more than with red lead, and this is simply due to the lubricating quality of graphite.

After a short time the mixture has hardened into a tough, elastic, leathery mass, instead of a hard, brittle one, as in the case of red lead, and when it is desired to take the joint apart, this yields at the application of very moderate force. The compound may be used wherever red lead is used, and in other circumstances where red lead is not at all suitable, as on gaskets.

This compound rubbed on the surface of gaskets enables them to be removed easily, so that they may be used again, thus effecting a considerable saving. Bolts inserted in green woodwork covered with it are prevented from rusting, and so are easily removed. Tap bolts may be made to fit very tightly and yet be put in and taken out without danger of twisting off the heads.

The ground surface of water-tube caps is kept in prime condition by its use. The manufacturers of this type of boilers are large users of it. Ground face flanges are now largely used. A thin coating of Pipe Joint Compound on these prevents rusting and adhesion.

In general, wherever you have any surfaces which are in contact, and where you don't want them to stick, use Dixon's Pipe Joint Compound.

Although the cost of Pipe Joint Compound for use in any one establishment may not be a very large item, yet economy even in small things should be practiced. Red lead costs nearly twice as much as Dixon's Pipe Joint Compound, not by weight, but by volume. A mixture of red lead and oil is about four times as heavy as a similar mixture of graphite; hence, to perform the same service, four times as much by weight must be used. There is also a great saving in another way. Mixtures of red lead and oil get too hard for use, if not used shortly after mixing, and have to be thrown away. This does not occur with mixtures of graphite and oil. Simply return what is not used to the package and cover with a little oil or water and it keeps indefinitely.

This is a material worthy of your attention and it will save you dollars and no end of trouble.

VISITOR FROM HAVANA.

It has been our pleasure to have a visit from Mr. Charles Blasco of Havana. Mr. Blasco is the representative of the Dixon Company for Cuba and is one of those energetic, strenuous young men from the United States, who has made a business success in his adopted country.

Mr. Blasco has lived in Cuba for over twenty years and is thoroughly identified with the business and social interests of that pleasant land. He has an interesting family consisting of wife and four daughters. He tells us that a boy will be gladly welcomed if the stork should happen along with one.

DIXON'S graphite publications are sent free upon request.

A COUNSELLOR AND ADVISER.

One who has Graduated through every Branch into the Zone of Prudent Economics.

It is quite possible that when a man comes to us under the above label that we do not appreciate the solemnity of the occasion nor the size and weight of the man quite as much as we should. We have tried out several doctors and professors of advertising and counsellors, advisers, etc., and have about come to the conclusion that after all is said, they are ordinary mortals, and that while they may have hit the bull's eye sometimes, they fail to hit it continually and often miss the target entirely.

The following letter is the latest received by us. It is worth the reading anyway:

"It is perhaps possible that I may interest you in the fact that I am employing my vast experience by serving large advertisers in the capacity of counsellor and adviser?

"This branch of our profession can only be practiced by those who have graduated through every branch into the zone of prudent economics and conservative wisdom.

"The larger an advertiser, the more strongly sagacious economy appeals to him; the more alert he becomes to the motives underlying methods proposed; the more emphatic becomes his insistence that good reasons sustain whatever policy is suggested; and the best tangible results must accrue as proofs of the correctness of the plans adopted.

"It is important that you know I have no association whatever with any advertising agency or publication. I have climbed too high to risk inevitable fall by any such connection in this matter.

"If I can serve your interests it must be as an unbiased counsellor without any prejudicial allegiances; fearless, frank, honest, candid, safe and profoundly experienced in all of the ramifications of advertising.

"I must show you how to save money and still progress. I must show you what the costly errors in advertising are, and how to avoid them. I must improve your advertising; make it more applicable and productive. I must relieve you of tedious examination of propositions. I must bring about delighting results with an ease that attests skill and capacity.

"Be assured that it is no reflection upon your business qualities that I firmly, yet modestly, insist that I can make you a good deal of money through saving where you now expend. Advertising is a profession, deep, broad, subtle; and it takes a lifetime to find out how deep, broad, and subtle. I think I have been a successful student, for I have done things that prove so.

"My services as counsellor on advertising (in all that implies) are at your disposal. No fee unless I earn it by saving you money. That is the sort of "doing things" I mean.

"I am counsel for some very large advertisers. Were it not violation of confidence I'd like to refer you to them. However, I suggest a talk. If we do not get together I make no charge. All I ask is as much sincerity as I extend to you.

"I shall be very glad to hear from you."

"ON KEEPING UP-TO-DATE."

Fame says that we keep alive only so long as we keep on making an effort to go forward.

We all have a tendency to "settle down," but we do not realize that to settle down is just about as fatal as it would be for a swimmer.

The real value and interest of business life lies in this. It is a gymnasium in which a man develops alertness. He simply can't lie back and be lazy. His competitors will have shot so far past him that he will be practically dead, if he tries it. He has to keep up, and if possible keep ahead.

If a man does not want to dry up and wither away, he must shake himself free of the idea that to settle down is a privilege to be earned, a sort of reward of merit.

The man of affairs who would keep himself in trim must keep alert and up-to-date.

There is an honest weariness which is not laziness, which should be heeded as a friendly warning, not crushed down. When a man's spirit cries out against the daily struggle and he begins to think it would be a welcome rest to be dead for awhile, he ought to stop trying to keep up-to-date, and rent an abandoned farm for a year. There are still places in the world where life is not strenuous. But tired nerves cannot make the rules for life. When the vacation is over, the normal man should be ready to do something again. The struggle should arouse in him the consciousness of power, the zest of life.

A FEW DONT'S ON CORRESPONDENCE.

1. Don't say "Enclosed please find—" say "Enclosed find."
2. Don't forget to refer in your answer to date of correspondent's letter.
3. Don't send out letters or packages with insufficient postage. It is annoying to the recipient to be obliged to pay postage on your letters.
4. Don't get into the habit of writing a particular class of letters in one way. There are several ways—it depends entirely upon the individuality of the man.
5. Don't forget to enclose a stamped envelope when asking for information.
6. Don't repeat your statements. Repetition is a waste of time.
7. Don't use long words or obscure expressions. Cultivate simplicity.
8. Don't write on both sides of the paper.
9. Don't be too brief. Write enough to convey the meaning you desire.
10. Don't forget to be courteous. A discourteous letter meets with disastrous results.
11. Don't write a letter while in a temper. If necessary to write it at all, give vent to your feelings, read it over carefully and then it will probably be consigned to the waste basket.—*Hardware and Metal.*

A SUMMER WARNING.

"Full many a mortal, young and old,
Has gone to his sarcophagus
Through pouring water, icy cold,
Adown his warm œsophagus."

—*Table Talk.*

HOW THE "DOLPHIN" WON.

One of our salesmen writes of an interesting talk he had with the owner of the yacht "Dolphin."

"Three years ago I bought some of Dixon's finely ground Flake Graphite from our local dealer to pot-lead the Dolphin. I got her all varnished but it began to rain when I had graphited only one side. Before I could finish the job, I went into a race with the "Meta", a ten-mile reach out and back. On the first leg I had to work the plain-varnished side against the water and the "Meta" beat us by a quarter of a mile to the stake boat. On the long reach home I had the graphited side of the "Dolphin" under, and finished thirteen minutes ahead of the "Meta."

Right now we're sending out copies of our attractive little booklet, "Pot Leading a Racer," and every yacht, motor-boat or launch-owner who wants to clip a good bit off his sailing time per mile will do well to send for a copy.

Dixon's "Pot Lead" has helped to win many a race.

THE GOOD OLD TIME.

Those of us who have heard much of the good old days will find the following from the *Scientific American* quite instructive.

According to one of the old English chronicles, royalty, in 1234, had nothing for a bed but a sack of straw. Even in the days of Queen Elizabeth at least half of the population of London slept on boards. Blocks of wood served as pillows. The sleeping chamber of the Queen was daily strewn with fresh rushes. Carpets were unknown. Henry VI. immediately on arising tossed off a cup of wine. Tea, coffee, and chocolate were, of course, unheard of at that time. Sugar was to be had only in drug stores, and then by the ounce. These were the good old times.

Bridgewater, Mass., Oct. 6, 1903.

Many thanks for your courtesy in sending me so *perfect* a pencil. *It is first class.*

I shall want another and will order direct from you, if they are not procurable here.

(Rev.) L. B. Codding.

Graphite

VOL. VII. JULY, 1905. No. 7.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

COPY FREE ON REQUEST.

KEEP THE HEAD YOUNG.

John A. Walker, vice-president and treasurer, as well as general manager of the Joseph Dixon Crucible Company, Jersey City, N. J., who is one of the up-to-date men of America, answered the question of the *Hardware Dealers' Magazine* in these words:

"Concerning the age limit, you will perhaps remember the other day that Andrew Carnegie addressed the Stevens Institute graduates, and in passing he condemned the game of football, and in addition said, that on general principles he was down on doing anything in the business line with the feet where the head could be employed. So when it comes to taking up the age limit, it is not so much as to how old one's feet are, or one's torso, or one's arms, but how old are your brains; and if a fellow's brains are good and young, and have all the vital qualities of youth, we do not care much how old his feet are.

"Some of us here in the management are getting a trifle gray, but our boast is that we manage to keep our heads young."—*Hardware Dealer.*

DIXON'S MOTOR CHAIN COMPOUND.

As illustrative of the merits of Dixon's Motor Chain Compound, we think the following letter, received at the Dixon London Office, will be a convincer to many who have not tried this compound.

MARTIN'S MOTOR MART AND GARAGE.

LONDON, S. W., March 22, 1905.

Joseph Dixon Crucible Co.,
26 Victoria Street, London, S. W.

DEAR SIRS:—

You will no doubt be interested in the chain which I have to-day sent you. This chain has been in use since last October on a 15 H. P. Panhard car, and the distance run has been 3400 miles, of which 1400 miles have been on muddy and snow covered roads met with during the past winter.

When new it was treated with your Graphite Chain Compound, according to the instructions in your booklet, and since then only once. The chain, as you notice, is in an extremely good condition, the wear on the rollers is not noticeable, but little side play, while the total stretch on a length of nine feet is but $\frac{5}{8}$ of an inch. Since it has been put on it has never required adjustment.

This chain speaks extremely well for the efficiency of your Graphite Compound, and bears out all your statements to me when you first brought it to my notice.

I am, yours faithfully,
(Signed) T. H. SCHULTERS YOUNG,
Manager, MARTIN'S MOTOR MART AND GARAGE.

This chain is on view at the Dixon London Office, 26 Victoria Street, S. W. To motorists not familiar with the peculiar merits of Dixon's Graphite Motor Lubricants we will have pleasure in sending our booklets, and giving their enquiries our careful attention.

HANDWRITING PUZZLES.

To the Editor of the *Herald:*—

Why do business men sign their names so that they cannot be read? To one in receipt of a large number of letters daily there is much time lost in deciphering the signatures of them. Most of them look as if their writers had studied hieroglyphics in Egypt rather than the English method of writing.

It may be an indication of genius to have a handwriting that few can read; but in this matter-of-fact age, business men should have some consideration for those to whom they write and sign their names so that common persons can read them. The signatures of some business men would make excellent material for your puzzle department.—LEGIBILITY.

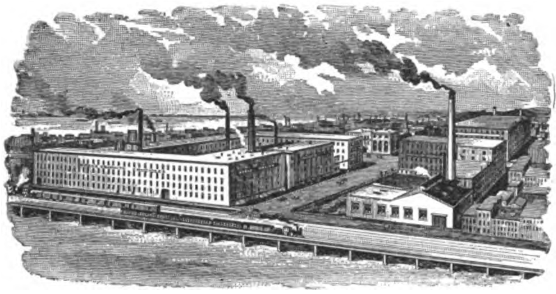
A GENUINE BENEFACTION.

The Gadsden purchase widened our confines greatly, but nothing will grow on such multitudes of its acres that it seems to have cost us absurdly high. Burbank will provide the means to make it a more real conquest.—*San Francisco Call.*

The prickly wild cactus grows over vast areas of the Southwest and remains green and juicy when the grass dies in long droughts, but cattle perish, unable to eat the plant because of its covering of spears. In producing a smooth and spineless cactus the wizard of Santa Rosa heads the list of those benefactors of the race who make two blades of grass grow where only one grew before.—*N. Y. Herald.*

DIXON'S graphite publications sent upon request.

ESTABLISHED 1827. **INCORPORATED 1868.**



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Cophenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

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JERSEY CITY, N. J., July, 1905.

HOME-MADE ELECTRIC SOLDERING IRON.

In which Dixon's Flake Graphite is Used for Resistance and Heating of the Copper End.

We print the following letter, which appeared in *The Engineer*, feeling sure it will interest many of the readers of GRAPHITE.

The enclosed sketch shows the construction of an electric soldering iron which I have made and which gives good satisfaction. The drawing shows one I made, and for heavy work it can be made larger.

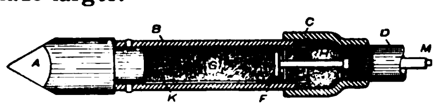


FIG. 1 COMPLETE SOLDERING IRON.

The tip, A, is of copper and is fastened into one end of the ⅜-inch pipe, B, by a rivet, as shown in Fig. 1. The pipe is lined with asbestos paper, K, which insulates the resistance, G, from the pipe, but allows it to make contact at the inner end of the tip, A, the resistance, G, consisting of flake graphite.

The current enters by wire, M, which is insulated from the handle, D, and passes through the graphite by means of contact, F. The other terminal is connected to the handle, D, which completes the circuit. The space, H, inside of the reducer, C, is filled with asbestos, which must be put in dry.

For use with the iron I made a lamp bank, as shown in Fig. 2, with which I can regulate the amount of current

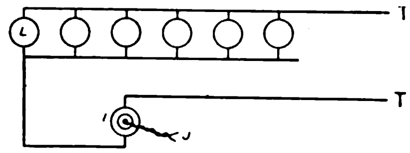


FIG. 2.

passing through the iron. The lamp bank consists of six 16-candlepower, 110-volt lamps connected as shown at L. The current enters at the terminals T, T. The socket, J, is connected in series with the lamps and by attaching the wires from the soldering iron at J, the heat of the iron can be regulated by turning on or off the lamps L. I find with the six lamps on that the iron will get hot enough in about five minutes, and if it gets too hot, I turn off some of the lamps. I use the iron on a 110-volt circuit, alternating-current.

The terminal, F, and the wire which passes through the asbestos, H, should be of iron for a short distance, as copper would not stand the heat as well as iron.—R. L. M.

AN APPRECIATION.

Sometime ago we published in GRAPHITE the following, to which a correspondent makes a neat reply:

I'm glad I'm an American!
Do you know the reason why?
'Tis the best and greatest country
Under the deep, blue sky.

The people here can rule themselves
Whene'er they choose to try;
And have liberty and progress—
Now you know the reason why.

I'm glad I'm an American,
And hope to live and die
In the best and greatest country
Under the deep, blue sky.—JAMES POOTON.

AN APPRECIATION.

(With apologies to Mr. Pooton.)

I'm glad I'm an American!
Do you know the reason why?
I'm proud of the Dixon Graphite,
'Tis the best the world can buy.

I'm glad I'm an American—
Now you know the reason why,
For "Dixon's Graphites" made right here
Under good old American sky.

STEELTON, PA., January 4, 1905. —J. W. C.

METUCHEN, N. J., Dec. 3, 1904.

Joseph Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN:—Enclosed please find a check for the amount of your bill.

Dixon's Graphite Axle Grease is the finest I have ever used, and I am not in the least backward in recommending it to my friends and patrons. ——.

GREASE AND AUTOMATIC GREASE CUPS.

By W. H. Wakeman.

In the January issue some ideas were presented on lubricating bearings with grease, but the subject calls for further attention, which I propose to give now.

The idea that a bearing must heat in order to melt grease contained in the slot provided for it, is applied to practice in thousands of cases, and under conditions found in the average mill or factory it seems to be the only practical plan, as many of these bearings are supposed to run for months without special attention.

The next best idea applied to this service is the grease cup fitted with a hand feed, consisting of a piston which is forced downward by a coarse thread turned by hand. However, this is not adapted to obscure places about a plant, as it needs systematic attention or else trouble will result, because it requires too much heat to bring grease down through the small outlet provided for such a cup, if it is not forced down by the hand feed.

The true theory by the application of which perfect lubrication is secured with grease, consists of forcing it to the bearing as fast as it is needed, regardless of temperature. This can only be done by an automatic grease cup properly adjusted.

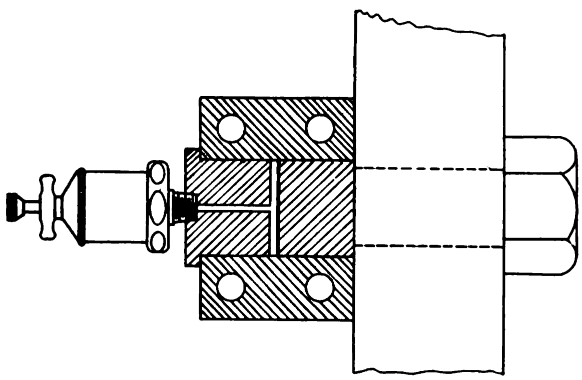


Fig. 1.

Fig. 1 illustrates a bearing on the shaft governor of a high speed engine which carries one end of the valve rod. In other words, this takes the place of an eccentric on a slow speed engine. The cap is removed and a cross section of the pin made in order to show holes provided for the passage of grease. One hole is bored through the head of pin to a depth corresponding to one-half the length of pin, where it joins another at right angles, thus giving two outlets. The cup is in a horizontal position.

Fig. 2 illustrates an automatic grease cup with the cover partly removed. When it is desired to fill this cup, the round gnarled head of the coarsely threaded spindle is held by hand, while the thumb nut under it is turned until it comes in contact with the top of cover. It is then screwed down still further in order to compress the spring and raise the leather packed piston, as shown. This spring can be compressed until this piston is drawn to the top of cup.

The body of cup is then nearly filled with grease, the piston entered and the cap screwed on tightly. By screwing the thumb nut up to the round top, the full force of spring is available to compress the grease and force it to the bearing. This thumb nut may be secured in any desired position by the set screw in one end of it.

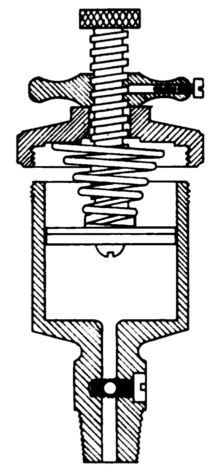


Fig. 2.

In order to complete the above it is necessary to bring grease to the cup, and as the piston must be removed every time, it is necessarily made a comparatively loose fit, as otherwise it could not easily be replaced. The natural consequence is that grease slips by the piston, especially if it is a thin kind.

A feed-regulating screw is located in the shank of cup. As shown it is closed, as the hole in it is at right angles to the central passage for grease. Any desired opening may be secured, either by backing out this screw until the hole is nearly drawn into the side of shank, or by simply giving it about 1/8 revolution from its present position.

The former method requires about three revolutions of the screw, to change it from shut to wide open, while the latter calls for but 1/4 revolution. The screw can be changed readily, as its head is exposed to view at all times.

Fig. 3 illustrates a better cup, although the same kind of regulating screw is used. When it is desired to fill this cup with grease, the thumb nut is turned until it comes in contact with the top of cup, thus removing all pressure from the top of grease, and the whole body is removed as shown. It can be taken to the grease box and refilled, without removing the piston from its cylinder. This is an important feature, as it is thus possible to make a perfectly tight piston that will prevent leakage of grease.

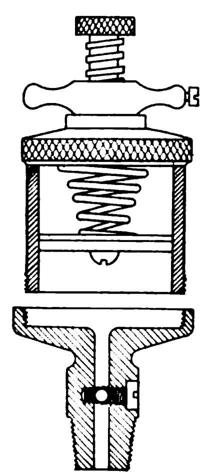


Fig. 3.

The illustration shows the piston only partly raised, but this is not the limit, as it can be forced upward until it completely compresses the spring, thus giving almost the full capacity of cup for storage of grease.

Fig. 4 illustrates a very good cup, having the same features which give satisfaction in the preceding cut, enabling the engineer to take the cup to the grease box as before mentioned. There is an important difference in the design of regulating screw, to which we call special attention. It is located inside of the cup, therefore it cannot be changed without removing the whole body. While this may be rather inconvenient at times, still it is out of the way, where it cannot readily be changed by anybody who should not touch it.

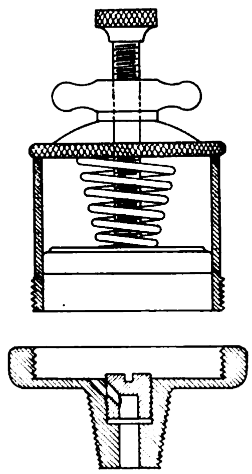


FIG. 4

As illustrated, the screw is raised enough to close about one-half of the passage, making it right for a medium grade of grease. A slight turn in either direction closes it entirely, while a complete revolution from "left to right," as the hands of a watch move, opens it wide.

This feed-regulating device is adapted to a thin or a medium grade, but will not answer for a thick grease, because the passage is not straight, and it is not large enough to let the lubricant pass freely.

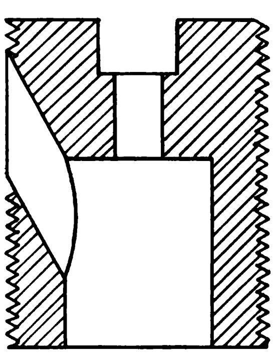


FIG. 5.

To overcome this objection I purchased several extra screws (which was not expensive, as they cost about two cents each), and bored a hole through each, as shown in Fig. 5. This affords a straight passage and by trying different grades of grease, with holes of various diameters, it is practical to secure the right size for a given grade which can then be used indefinitely without change.

Some trials of this kind can be made before applying the cup to a bearing, for if a screw with a straight passage (see Fig. 5) is put in and the cup filled with thin grease, it may act as shown in Fig. 6, thus showing that the passage is too large for the grease used. In this case the spring has forced the piston upward until the thumb nut rests on the cover, after forcing thin grease out rapidly.

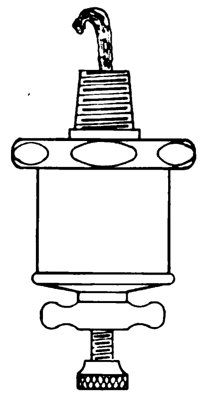


FIG. 6.

If it is desired to use this grease, a regulating screw with a much smaller hole through it must be used and another trial made. When grease comes out very slowly it is right for trial on a revolving shaft, but such a trial must be made in order to settle the point.

Experiments should be made until the right diameter of passage is found for a certain grade of grease. Do not attempt to mix two grades together, forming a third that will answer (?) for a given regulator, because there is almost sure to be thick and thin portions resulting in an irregular feed that will be unsatisfactory, for it is not practical to mix it as thoroughly by hand as the makers do by machinery.

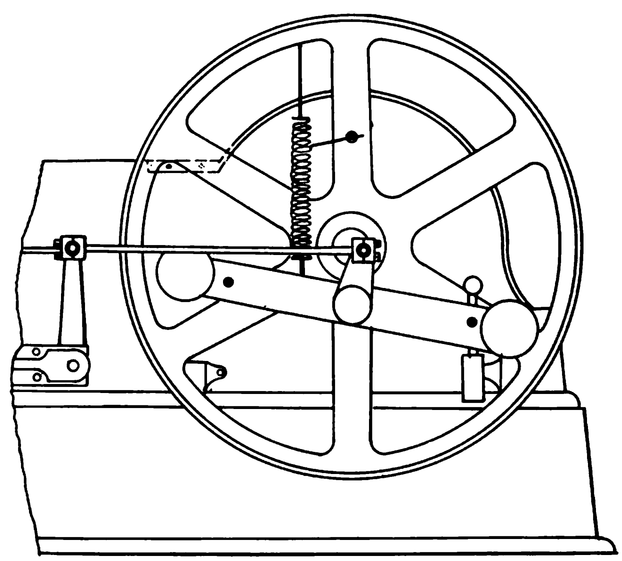


FIG. 7.

The difference between an ordinary grease cup operated by hand, and a good automatic specimen can only be appreciated by those who have used both under working conditions. Taking a stationary bearing does not provide a fair test, therefore an engine revolving 300 times per minute was selected for this purpose, and the bearing shown in Fig. 1 is still further illustrated in Fig. 7. From this it will be plain

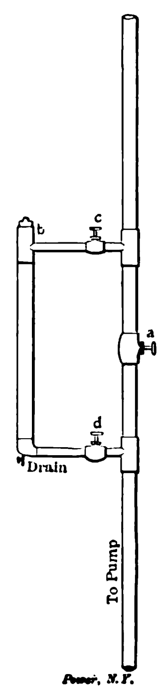
that severe conditions were selected. Dixon's Graphite Cup Grease No. 3 provided ample lubrication, and proved very economical.

With a common grease cup that required hand regulation, it required careful management to make the cup full last one day, but when the automatic cup shown in Fig. 4 with a straight passage was substituted, the same amount of grease lasted three days and gave much better results, as the lubrication was continuous, whereas with the hand feed it was intermittent and unsatisfactory, causing excessive wear of the brass boxes. These cups were made by The Lunkenheimer Co., but the specimen chosen for trial was bought in the open market out of the regular stock carried by a supply house, and was not especially made or fitted for the purpose.

FEEDING GRAPHITE TO THE PUMP.

One of my pumps made a groaning noise in the cylinder, and giving it more oil would not stop the noise. I examined piston and valve, but found nothing wrong with them, so I thought I would try a little graphite. I removed the cylinder head and put some in mixed with cylinder oil, and when I started the pump again the noise had disappeared. The next day the noise was there again, so I thought I would find some way to get graphite into the cylinder every day without removing the head. I cut the steam pipe above and below the stop valve and put two 1x1x¼ inch tees in, then made a cup as shown in the sketch, which I find works all right.

Now mornings before I start the pump I get all the water out of the steam pipe and cylinder, then I close the valve *A*,



FEEDING GRAPHITE TO THE CYLINDER.

remove the plug *B* and put into the cup a tablespoonful of graphite mixed with a little cylinder oil, then replace the plug *B*, and open the valves *C* and *D*. The graphite will go into the cylinder of the pump, and when I think the graphite is about out of the cup I close the valves *C* and *D* and open *A*. The cup is made out of a 1-inch nipple about three inches long with a 1x1x¼-inch tee on the top end and 1x¼-inch ell on the bottom end.—J. H., Milwaukee, Wis.

THE CARE OF DRIVING CHAINS.

By C. L. Lampkin.

The chain of an automobile is a much abused part, as it is very seldom protected from dirt, and is subjected to heavy strains and jerks, so that one wonders how it stands as much as it does. A chain to do good work should be well taken care of, and properly cleaned and lubricated, but is very often neglected because handling it is such a "dirty job." A very convenient and efficient way of cleaning a chain in a repair shop is to have a tank made of galvanized iron, as shown in Fig. 1, with two wood strips on the top edges to bolt or screw bearings to. At one end put a dolly box (or bearing) with a shaft running crosswise of the tank, on which fasten sprockets of different pitches to accommodate the chains most-

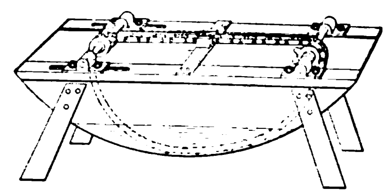


Fig. 1.

ly used. On the other end use dolly boxes with a shaft running crosswise and parallel with the sprocket shaft and having a flanged roller on it. These dolly boxes can be made of wood, if desired, and slotted for bolt holes to allow for adjustment of the chain to suit the various lengths, or, better still, the wood strip can be made with deep slots and accomodate a greater difference in lengths. A pully or crank can be used on the sprocket shaft to apply power by. If used in a shop, or where there is power, it can be connected by belt to some slow moving pully.

Adjust the chain so the slack side will just clear the bottom of the tank, place a common sink brush on a crossbar so it will rub the chain lightly, put gasoline (some use lye, but it is hard on the hands) enough in the tank so it will cover the lower chain, and start the pully in motion. A very few minutes will suffice to clean it thoroughly. Then wipe dry and oil with good lubricating oil, wiping off the surplus oil, and then apply a mixture of oil and graphite mixed to the consistency of paste, or Graphitoleo will answer as well.

In replacing the chain on the car the method of proceeding depends upon whether the rear axle has spiders or open construction, or whether it has the differential encased. In the former case the chain can be put on the small sprocket first,

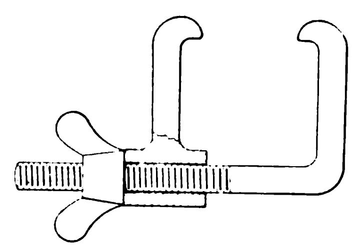


Fig. 2.

and then connected on the rear sprocket, the same as a bicycle chain, without tools; but where the rear sprocket is encased it is more difficult to connect the chain without special tools or without loosening the adjustment of the strut rod. Sometimes baling wire is resorted to, and it is not to be de-

spised, for it has helped many an autoist out of trouble. A handy device for connecting chains, and one which should be in every chain user's kit, is shown in Fig. 2. The tongs as shown in Fig. 3 are very quick and handy, but the tool shown has an advantage in holding the chain at any place and allowing free use of both hands to connect the link. After the chain is connected and the cotter pins are in, it should be adjusted so there is a little sag to it, just enough to allow it to move freely, as a tight chain will require a lot of power to drive it. I have seen an engine nearly stalled just by having the chain too tight.

In adjusting the chain care should be taken to have the engine shaft and rear axle parallel; that is, supposing the car to be a standard runabout with the transmission on the engine shaft and chain drive direct to the rear axle. Some measure between the front and rear axle, but that is not always correct, although it should be. If a chain does not run smoothly it should be examined to see whether it is worn or what is

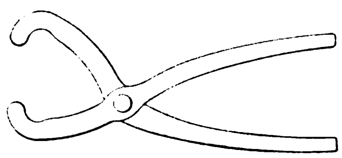


FIG. 3.

commonly termed "stretched," as this will change the pitch so it will not fit the sprocket, and the links will be too long. The small sprocket should also be examined, as it wears much faster than the large one, owing to the small number of teeth in it. If it is worn so the teeth have a hook, as shown by the dotted lines in Fig. 4, it will have a tendency to wind the chain around it and the latter will drop off with a crashing grind. This can be remedied to some extent by filing or grinding the lump, but if the sprocket is much worn, better put on a new one. A sprocket having a greater number of teeth causes less wear on the chain, as the latter does not have to bend so short in going over it.

Some makers originally made the mistake of gearing their cars too high, and having a rear axle that would not allow the use of a larger sprocket, on account of the housing around it, their only alternative was to reduce the size of the sprocket pinion, and the size of the engine shaft put a limit to that, leaving a very narrow margin for fastening the sprocket to the low speed gear, which was accomplished by using eight small steel pins as rivets; but these sometimes shear off and then someone has to throw a tow line, and about the only way to

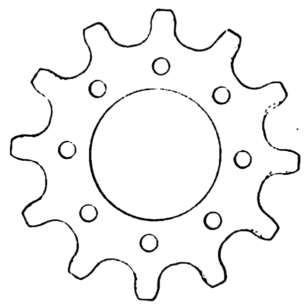


FIG. 4.

repair the damage is to put new rivets in, of the best material available, and trust to faith for the rest. It is just one straw that shows where careful designing is necessary to success. A car that is suited to one locality is not always adapted to another, and right there is where a good designer can show his worth by making a thing so it can be slightly altered without creating a weak point and making it adaptable to almost any work that might be required of it. I consider it the duty of every manufacturer who has an agency on the Pacific Coast to either come out here or send a man well qualified, to learn the exact conditions, as it would be to the interest of himself, his agents, and the buyers, to know the work required of his product.—*Horseless Age, March 8, 1905.*

SYSTEM RUN MAD.

Oh, isn't it great to be "up to date"
And live in this year of grace,
With a system and place for everything,
Though nobody knows the place!

We've an index card for each thing we do
And everything under the sun;
It takes so long to fill out the cards
We never get anything done.

We've loose-leaf ledgers for saving time,
The Lord knows what they cost,
When half our time is spent each day
Hunting for leaves that are lost.

Stenographers who spell like h——
And make us swear and cuss,
When we are not dictating to them,
Why, they are dictating to us.

And sectional this and sectional that,
(We'll soon have sectional legs);
I dreamt last night that I made a meal
Of sectional ham and eggs.

I dreamt I lived in a sectional house,
And rode a sectional "hoss,"
And drew my pay in sections from
A sectional "section-boss."

Oh, isn't it great to be "up to date"
And live in this year of grace,
With a system and place for everything,
Though nobody knows the place!

—*Contributed.*

TRUE QUALITIES OF CHARACTER.

Henry S. Pritchett, President of the Massachusetts Institute of Technology, says in *Youth's Companion:*

"To the great essential qualities of character, which good men must have—energy, sincerity, devotion, moral courage, unselfish purpose—must be added that rarest of all human endowments which we call common sense; that is, the ability to think straight, the power to see both sides of a question."

VALVES GROANED.

But Graphite Cured Their Complaining.

The following interesting letter is clipped from *Engineers' Review,* and although it is an unusual complaint from which this engine suffered, the engineer's method of curing it is all the more interesting.

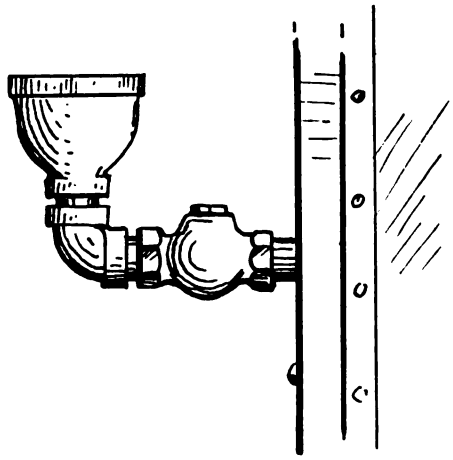
The check valve on the cylinder head suggests the locomotive relief valve through which the engineer applies Dixon's Graphite when "drifting," as the air sucks into the cylinders to relieve partial vacuum,—"snifting valves" the English engineers call them.

EDITOR *Engineers' Review:—*

This particular engine was started up early on Monday morning, after being idle from the previous Saturday, by the engineer who was to run nights last week. On starting up on Monday morning, the exhaust valves would almost groan and squeak.

The work this engine had to do was very intermittent. After doing its best work for a short interval, it instantly had no load upon it for a moment. At this time the governor would release the steam valves altogether and they would stand still for that time. The consequence of this was that there would be a partial vacuum behind the piston which would drag back on it and hinder rather than assist the steam in pushing it forward. This caused the exaust valves to rise from their seats sufficiently to make a disagreeable knocking. To balance this atmospheric back pressure on the piston, and, incidentally, to stop the slamming of the valves, the superintendent of the mill had ½-inch check valves put on each end of the cylinder. These opened in and were attached to nipples which were screwed into the holes made for the indicator piping.

It will now be understood how the cylinder was filled with cold air when the steam valves were not working. Now we have an opportunity of making an arrangement for supplying graphite to the cylinder and valves. We attach short nipples to the outer end of these check valves and on the nipples we screw elbows, turning them end up. In these we also screw nipples and then 1½ by ½-inch reducers. The large open



end formed a convenient funnel-shaped opening through which we could apply graphite or oil to the cylinder and exhaust valves when the engine was doing no work, as occured at short intervals, when the piston would draw air into the cylinder through the check valves.

As before stated, the exhaust valves would begin to squeak and continue to do so all day unless an extra quantity of oil or graphite, or both, was supplied to them in this way. The regular supply of oil from the lubricator was not sufficient to prevent the squeaking.

On starting up Monday morning I supplied a little extra oil to these valves, which would stop the squeal for a time. Then I tried oil and graphite together, which stopped the squeak for a week.

There are many other uses for graphite around the steam plant, as most engineers are aware, but success in its use may, like everything else in engineering, even down to the painting of an engine, "demand perseverance, attention to details and thoroughness."—W. I. DAY.

GRAPHITE FOR RING-OILED BEARINGS.

There are many times when engineers would like to use Dixon's Graphite on dynamo and other ring-oiled bearings, but they are deterred by the fact that the graphite will settle to the bottom of the reservoir over night and not be stirred up by the motion of the rings. The rings will stir the oil sufficiently to keep the graphite from settling, however, once it is stirred up. The following ingenious method for overcoming the above difficulty is described in the *Engineers' Review,* for March.

"I once ran a dynamo that gave me trouble from the time it was new. It would get so hot that the oil would smoke after it was drawn from the oil reservoir in the bearing. I tried all kinds of oils without any relief and finally I used graphite in the form of a fine powder in the ring oilers of the dynamo, and to this day I have not had the least sign of a hot bearing on the machine.

The only difficulty I had was that the graphite would settle in the bottom of the box when the machine was shut down and would not move when it was started. To overcome this, I put a short piece of ¼-inch hose on the pet cock used for draining the oil. After starting I would open the pet cock and blow in the hose. That would stir the graphite from the bottom where it had settled and everything worked all right."—JOSEPH K. MERCER.

HE IS A BENEDICT.

"Mr. and Mrs. Willis G. Nash request the honor of your presence at the marriage of their daughter, Mabel Morris, to Mr. George Pelton Hutchins, on Tuesday, the sixteenth of May, Nineteen Hundred Five, at twelve o'clock, at Saint Peter's Church, Albany."

So read the invitations, and Mr. George Pelton Hutchins of the Dixon Company is now a Benedict.

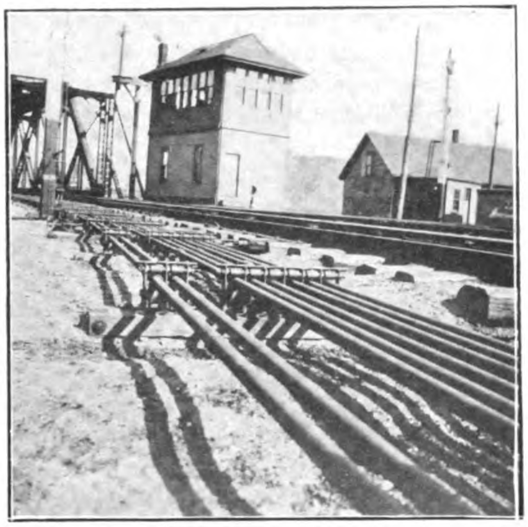
"Lovely woman is the sugar,
Spoons the poor men often be,
Matrimony is hot water—
Oh, life is like a cup of tea!" - *Table Talk.*

TOMMY—"Ma, lend me a lead pencil."

MOTHER—"I just left pen and ink on the table for you. What do you want with a pencil?"

TOMMY—"I want to write to the editor of the paper to ask him what'll take inkstains out of the parlor carpet.

—*Philadelphia Public Record.*



PAINTING OF SIGNAL PIPES.

Passengers on trains frequently notice the miles of signal pipes they pass, but comparatively few people have any idea of the important function to which these carefully arranged lines are assigned.

The vital part they play in railroad work will be understood when it is realized that they connect the signals and switches with the distant signal towers where well trained men are busy day and night giving passing trains the right of way.

These pipe lines are not only affected by atmospheric conditions, which come with the hot sun and rain and wind-driven dust of summer, the ice and snow of winter, but portions of the surfaces run over rollers and some sections of the piping are frequently walked on.

For this reason it is absolutely necessary to have the pipes protected with a tough, elastic coating which will be proof against abrasion and corrosion. Such a coating is obtained by using Dixon's Silica-Graphite Paint. The nature of this paint is such that it assists in the lubrication of the rubbing surfaces instead of retarding such movements as would be the case if other paints were used.

Dixon's Silica-Graphite Paint is easily applied and covers well. While these advantages make the paint economical in point of first cost, still more important to the railroad man is the fact that Dixon's wears longer than other paint, which means a large saving in material and labor. Were it not for the use of Dixon's Silica-Graphite Paint it would often be necessary to disconnect the pipes and turn them over for the purpose of repainting. One can readily appreciate the trouble and risk attending such an operation.

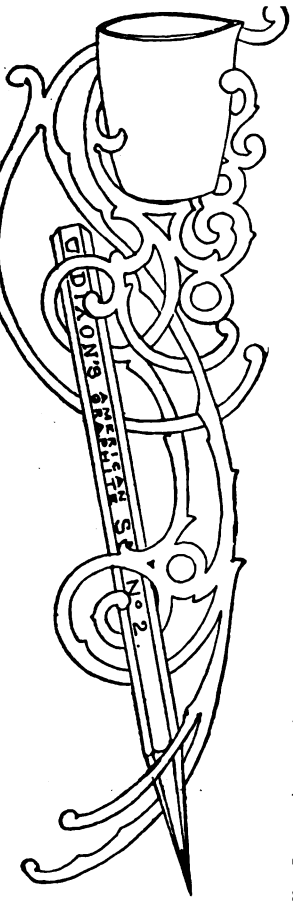
The accompanying illustration is from a photograph taken in New England and shows a section of signal pipe lines of the New York, New Haven & Hartford Railroad. Dixon's Silica-Graphite Paint, Natural Color, was used for this work.

All eyes, of prince or beggar maid,
In beauty framed, or ugly mien,
Alike have beamed with bubbling joy;
So, pauper, potentate and queen,
All, touched by sorrow, love and fear,
Have likewise dropped the scalding tear.
The eyes that *Dixon's Pencils* choose
Are *never* troubled with "the blues."—C. M. H.

Graphite

VOL. VII. AUGUST, 1905. No. 8.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



COMPETITION AND SALESMANSHIP.

Space forbids us from printing all of the good things said by Mr. James H. Reed in his address at the Eighth Annual Meeting of the Stove Salesmen's Association of Pennsylvania, at Philadelphia, December 21, 1904. But the following will be found of interest to the Dixon Salesmen as well as to the readers of GRAPHITE:

Competition is the great business tonic. There is nothing like it to put a man on his mettle. Competition is the one thing that makes our vocation of any value.

There are two classes of competition—that of price and that of quality.

The man who sells goods for fun sooner or later realizes that he does not even get the fun. He hears laughter but it is not his own, although it is for him. He then becomes aware that it is his discount and not his goods that are popular.

The man who talks quality and builds quality makes his own market. He creates an exclusive business for himself and his customers. This is the man that is hard to beat; and if, by reason of his system or local environment, he is able to offer good goods at popular prices, such a man is well-nigh invincible in the market which he seeks.

To be successful a salesman must be thoroughly impressed with the merits of his line. He should be so in love with his goods that every time he shows them he will feel like buying a bill himself. Confidence in his line is absolutely necessary to a salesman's success.

Salesmen on the road should never remain away from the house for too long a period. Money expended for railroad fare to headquarters at reasonably frequent intervals is money well spent. A salesman's environment while on the road is such that if he is not brought home and put through a revitalizing process he will yield to the adverse suggestions of his trade and lose his force.

It is important that the salesman should receive friendly letters from his house while on the road. An unfriendly letter will cost his house money, for a salesman's sensitiveness is abnormal by reason of the character of his work.

The house advertising has it in its power to give needed stimulation to salesmen and to divert their efforts into desired channels. Advertisements intended for salesmen should be written as though intended for their customers. These advertisements, operating upon a salesman's mind, build up within him a force which, when directed toward an individual buyer, becomes intensified power for selling the goods it is intended he should sell.

Articles sold through advertising cease to sell the moment the advertising ceases. A salesman's energy is like an advertisement—the moment he ceases to urge his customers to activity on his goods that moment marks the beginning of a decline.

It sometimes happens that a salesman on the road develops a complaining spirit. He becomes saturated with the idea that if his house would only follow his guidance it would do a better business, and if this condition long prevails it will develop the habit of grumbling about those who are in authority over him. This is an unfailing sign that the man is suffering from a condition of mind that is fatal to success. There is but one prescription for that ailment, and that is the one written by Elbert Hubbard: "Get out, or get in line."

"ALL'S WELL THAT ENDS WELL.

50 CANAL ST., HOLYOKE, Mass.

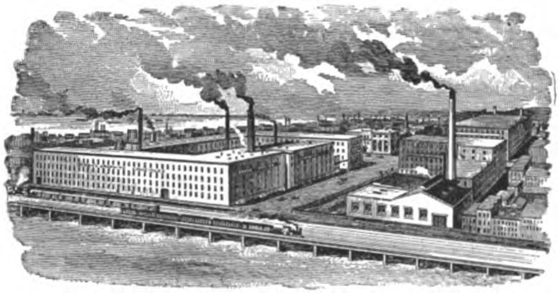
Joseph Dixon Crucible Company,
Jersey City, N. J.

MY DEAR SIRS:—Yours of the 9th inst. at hand, and in reply will say that I have used your products for a number of years with first-class satisfaction. I have used your graphite both on boxes and mixed with cylinder oil—in cylinders—some years ago, previous to my coming here. I had some cylinder oil sent me that on starting to use proved to be so very poor that we could not feed it fast enough to make it do the work. Not having any other oil on hand, and being in an out-of-the-way place, I was "up against it," but for only a short time, for I had a can of Dixon's Graphite, a small amount of which I stirred into the oil. I pumped that into my cylinders and my troubles were all at an end.

Yours very truly,
(Signed) A. C. CONWAY, *Engineer.*

Veterans' Home, Napa Co., Cal., Aug. 30, 1903.
Your excellent pencil, 'Eterno,' is all one could desire. Accept my thanks and congratulations.
E. E. Elliott.

ESTABLISHED 1827. **INCORPORATED 1868.**



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

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304 Market St., San Francisco. 26 Victoria St., London.

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GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* **JOHN A. WALKER,** *Vice Pres. and Treas.* **GEO. E. LONG,** *Secretary.*

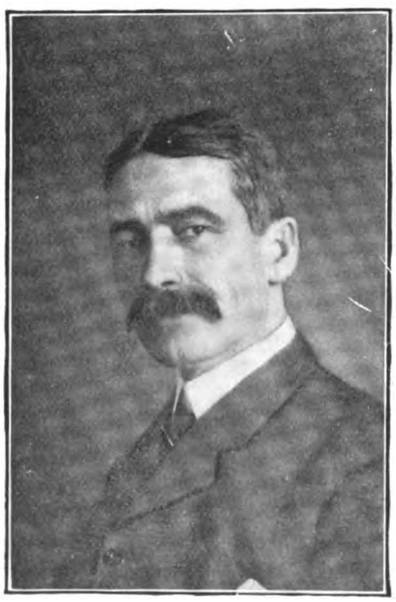
DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., August, 1905.

A DIXON GLOBE TROTTER.

The Joseph Dixon Crucible Company reaches out for trade in many countries and in many climes, for graphite in its varied forms, from paint to pencils, finds a demand whether the temperature be frigid or torrid. Of course they have many travelers, all high-grade, pushing men of ability; but the one of these who goes farthest afield is undoubtedly R. A. Brown, who is just now being made at home in New York by Manager John M. Ready, of the metropolitan office.



Mr. Brown is just back from a brief jaunt which has consumed his time for the past two years and a half, during which he has crossed several continents and the equator half a dozen times. He is the picture of a bronzed and hardened traveler, reminding one somewhat of the pictures of Henry M. Stanley in his prime.

The mere itinerary of his journey is bewildering. On December 10, 1902, after returning from Mexico and South America, he left New York by train for San Francisco, from which point he took steamer for New Zealand. He covered the North and South Islands and crossed to Sydney on the mainland. From here he went up the Queensland coast, thence back again to New South Wales, westward to Melbourne, Tasmania and South Australia, and to the Western Australian gold fields, where there is a lively demand for the Dixon products.

At this stage of the journey it was mid-winter of 1903 in that part of the world, while it was mid-summer here. This insured for him a cool voyage to South Africa, which was his next objective point. From Cape Town he went up to the Transvaal, visiting Pretoria and the Kimberly diamond fields, likewise Delgoa and Algoa Bays and East London, where he took ship for Bombay. This route included Portuguese East Africa, Biera, Mozambique, Chinde (mouth of the Zambesi), Zanzibar and two or three ports in Somaliland. Then across to Goa, Portuguese East Indies, and thence to Bombay.

From Bombay Mr. Brown went across by sail to Madras and the gold mines of Southern India, and thence by rail 1,000 miles north to Calcutta. From here he crossed the Bay of Bengal to the city of Rangoon in Burmah, and then journeyed to Penang, which lies between Sumatra and the Malay Peninsula. After showing the Dixon samples here and booking orders he voyaged to Singapore, 400 miles distant, following this with a jump of 1,400 miles to Hong-Kong. On this route the Russo-Japanese war had broken out, and steamers were scarce, but he finally caught a boat sailing for Japan and four days later reached Moji, in that island. Here there was a considerable delay on account of transports coaling, but he finally reached Kobe, from which he was obliged to proceed by boat to Yokohama, on account of the railways being blocked with troops. From here Tokio is but an hour distant. From Yokohama he sailed for Shanghai, and on his steamer were the first batch of war correspondents bound for the front.

From Shanghai he went to Canton, via Hong-Kong, and later to Manila. Returning to Australia by way of Torres Straits, smallpox broke out aboard the steamer, and everybody was quarantined at Sydney for three weeks. After covering much of the territory he had in 1903, he worked his way back to India, and from Calcutta crossed the country by rail, 1,400 miles to Bombay. The best train on this route is the mail train, which runs once a week and has what is called a sleeper, which means that facilities are offered for stretching out on the seats. As all passengers carry their servants the latter can make up pretty fair beds for their masters. There is also a dining car on this train, which Mr. Brown says is very fair, "considering."

From Bombay he journeyed to Egypt, an eight-day trip, where he stopped a week in Alexandria, the principal business point. From Alexandria he sailed for Marseilles; thence to London, and finally back to New York in the usual way. The travelers who make Newark and Bridgeport as a regular thing, will probably envy Mr. Brown.—*Geyer's Stationer.*

DIXON'S FLAKE GRAPHITE FOR PIPE FITTING.

Threaded joints should be lubricated, not only to aid in making tight connections, but to enable them to be opened without difficulty whenever necessary. Dixon's Flake Graphite is a widely valued lubricant for pipe threads, making close and tight connections an easy matter to obtain and allowing them to be unscrewed easily after any length of time.

On shipboard there are joints to be unmade, bolts and caps to be removed at the end of every trip, and if Flake Graphite has been put upon the threads, openings and changes can be made without the slightest trouble, and without breaking fittings or wrenching off bolt-heads. If, on the other hand, threads have been painted with red or white lead or even made up "metal to metal," they usually "set" or else rust so that it is nearly impossible to open them without straining or breaking something. Flake Graphite saves annoyance and trouble, broken tools and piping, time and money.

The very best form of graphite for pipe fittings is Dixon's Graphite Pipe Joint Compound, the vital ingredient of which is Dixon's Flake Graphite. Many marine engineers consider this an indispensable supply, not alone for all their pipe fitting work but for metal gaskets, faced connections, boiler caps, man-hole and hand-hole plates, and every nut, bolt, stud, cap, cylinder and valve cover.

We will gladly send you a free sample of this excellent Graphite Pipe Joint Compound if you would like to test it.

CORRESPONDENCE.

Sometimes we receive a letter criticising us for not having replied to some previous communication.

We receive daily several hundred letters that come to us from all parts of the world, and once in a long while a letter may get mislaid for a time or, what is rarer still, lost entirely by getting in a wrong department and being filed away without answer. Such incidents are so rare that they are hardly worth mentioning.

We should like the readers of GRAPHITE and all others, if they could know of it, to understand that we are very glad to answer all inquiries, whether they relate to graphite and its productions or whether they are letters of inquiry for information concerning goods, machinery, or materials of any kind.

We frequently receive inquiries from abroad asking for information on matters quite foreign to our own business, but we are always glad to answer such inquiries. We are equally glad to answer all inquiries from correspondents in our own country, and if a letter sent us does not receive prompt reply, it is because it is lost in the mail or accidentally mislaid.

DID SHE MEAN DIXON'S CARTERET?

We find the following in "Bas Bleu," by Anna A. Rogers, in June *Ainslee's*.

"Near the door to the reception room was a piece of paper; he slipped on a round 'Carteret' pencil as he went to his desk in a silence that he felt that he could not break without also breaking a few other things."

J. F. DRAKE WINS A NEW HAT

For Selling More of Dixon's Graphite Axle Grease Than any Other One of the Dixon Salesmen.

Sometime ago we promised that the Dixon salesman who should sell the most of Dixon's Graphite Axle Grease should receive a new hat. Mr. J. F. Drake, who represents the Dixon Company through the Southern States, gets the hat.

He sold thirty-five per cent. more than our handsome St. Louis representative, Mr. Sam. H. Dougherty, who was the next best man.

In fact, Mr. Drake and Mr. Dougherty were the only ones seriously in the race, as the third best sold only about one-third as much as Mr. Dougherty and about one-fourth as much as Mr. Drake, while the other good and tried Dixon salesmen weren't in it, comparatively speaking.

GRAPHITE FOR GAS ENGINES.

MEADVILLE, Pa.

Joseph Dixon Crucible Company,
Jersey City, N. J.

DEAR SIRS:—I wish to thank you for your booklets sent me which contained the information I desired and which also gave me some pointers where to use Dixon's Flake Graphite to advantage in other places. Last week we tested a 250-H. P., 4-cylinder gas engine and found Dixon's Graphite to be just the thing necessary on the testing floor. We used it in the cylinders and on all bearings. It gave the best of satisfaction, leaving the cylinders with a perfect gloss after the test.

Hoping to write you later of the further successful uses of graphite, I remain,

Respectfully yours,
(Signed) ALBERT ALBAUGH.

LETTERS FROM FAR-OFF PLACES CONCERNING DIXON'S PENCILS.

The Educational Department of the Joseph Dixon Crucible Company received recently in the mails three letters from places somewhat remote; they simply show how far-reaching and extensive are the advertisements sent out by the Dixon Company. The first letter was from Greencastle, Drumlea, Tyrone, Ireland, and the writer wished to see samples of the famous Dixon pencils. Even to that village, and it is quite a small one, the Dixon advertisements had penetrated The second letter was from a principal of a boy's intermediate school, in Seoul, Korea, and this writer wanted to see samples of the Dixon Crayons, and also the little color booklets and printed matter which give a full description of these goods. Even the combined forces of the Russian and Japanese armies cannot keep down this thirst for education along the Dixon color line. The third letter was from a teacher of a high school in the Island of Mindanao, one of the southern groups of the Philippine Islands near the Sulu Sea, and this teacher wrote that they had twelve hundred pupils in their high school, and every one of them were using the Dixon pencils. This teacher had been brought up to appreciate the Dixon goods in this country, and carried his faith with him to these remote islands of the sea.

SOMETHING ABOUT CONDENSERS.

By W. H Wakeman.

Chapter I.

As there appears to be a demand for information concerning the objects sought when a condenser is added to a non-condensing engine, owing to the fact that some engineers in charge of this class of machinery do not understand the details of its operation, these chapters are presented for the purpose of giving ideas on the subject, which the writer hopes will be of value not only to those who are running one or more of these engines, but to others who desire more knowledge on this important subject.

When the steam engine was first made a practical success, it was run condensing in nearly every case, but the condenser made it more complicated than was desirable, because the cost of attendance and repairs is greater where auxiliary appliances are used, therefore it is satisfactory in many cases to burn more coal and have less trouble and expense than are called for by the condensing engine.

When steam is admitted to the cylinder of an engine, it must first overcome the pressure due to the atmosphere. This is about fifteen pounds to the square inch, near the sea, but is less as greater heights are reached.

Having driven all air out of the cylinder, pressure accumulates as more steam is admitted, until there is enough to move the piston, but atmospheric pressure is acting on the opposite side of this piston to the extent of say, about fifteen pounds to the square inch. Suppose that we have a Corliss engine in which the steam valve on one end is open, allowing steam to enter the cylinder and act on one side of the piston. The exhaust valve on the other end is open, consequently if a condenser is working on the exhaust pipe nearly all air pressure can be removed from the other side of piston, leaving much less resistance for it to overcome.

From this simple illustration and explanation it will be clear that when a condenser is added it makes the total load less, and as a perfectly natural consequence less steam is wanted and less coal is burned. This does not refer to the indicated power but to the total load.

A full investigation of this subject leads us to ask what a condenser is, and in reply comes the statement that it is nothing more or less than a large pump which pumps out the exhaust steam faster than it would otherwise travel.

It appears as if it would cost as much to thus pump it out as it does to let the piston force it out, and it would probably prove so in practice if the pump or condenser handled the full volume of steam, but it does not.

It is often stated that a cubic inch of water when evaporated makes a cubic foot of steam, and this is true, provided the pressure is light, as it always is in the exhaust pipe of a condensing engine. It naturally follows that if a cubic foot of steam is condensed it will be reduced to a cubic inch of water.

This illustration shows at once why the condenser can take the exhaust steam with less expenditure of power than is required by the engine piston. Of course it is the air pump which really removes the steam in connection with the condenser, but by common practice when a condenser is mentioned it includes the air pump. This machine might properly be called the steam pump, but then it would be necessary to make an explanation of what is meant, as steam pumps are used for so many other purposes.

Water in its natural state contains more or less air, which is pumped into a steam boiler and must be mixed with the steam generated, as it has no chance to escape. This is not noticed until steam is exhausted from the cylinder, but it then is brought to our notice because it cannot be condensed, therefore must be pumped in full volume. When an air pump is designed this becomes a prominent factor, as the piston and cylinder must be made larger on this account. The fact that it must dispose of all air found in exhaust steam affords an excuse for calling it an air pump, which at the same time distinguishes it from those used for other purposes.

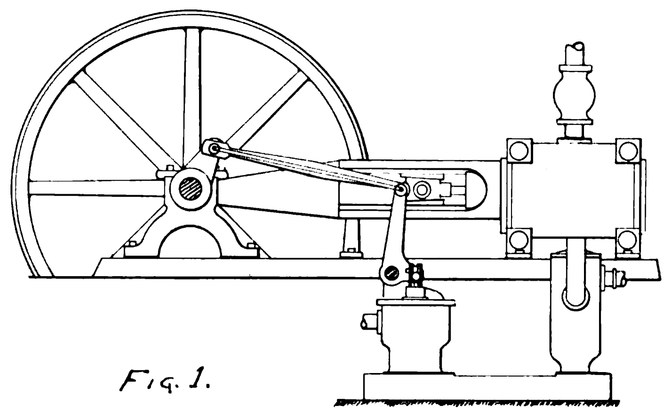


Fig. 1.

Such a pump must raise water enough to condense the exhaust steam which under average conditions will be about thirty times as much as was required to supply the steam delivered to the engine, but even then the volume of material that must be taken care of by the air pump is small compared with the volume exhausted from the cylinder.

Fig. 1 illustrates one of the most simple forms of air pumps. It consists of a short vertical cylinder operated directly from the crank pin of engine, by means of a connecting rod and a bell crank lever. The whole apparatus is located directly under the engine room floor, alongside of the foundation. From the exhaust chest, steam goes directly to the condenser, into which a large volume of water is also delivered. This and the water resulting from the condensation of steam is drawn out by the air pump.

This is known as a jet condenser. While it is simple in design and construction it cannot be started in advance of the engine, therefore every such machine must be set in motion as a non-condensing engine, and converted into a condensing outfit afterwards.

Fig. 2 illustrates a more complicated machine, but better results are secured by its use. Steam from the cylinder of engine is exhausted through the main heater *2* and separator *3* to the air pump *4*, which draws its supply of water from the pond *5* and discharges it through the pipe *6* to the sewer. The boiler feed pump *7* takes its supply from this pipe at a temperature of about 110° Fahr. and pumps it through the main heater *2* where it is raised to about 125°. From this it goes to the auxiliary heater *8*, where its temperature is increased to 200° or more, making it fit for

boiler feeding. Steam from the air pump *4*, also from the boiler feed pump *7*, is exhausted into this heater, and as all such direct acting pumps are wasteful of steam, there is enough of it to heat the feed water as described. On this account a wasteful pump, so far as its own efficiency is concerned, costs no more for operation than one of the more economical type, because the heat is returned in the feed water.

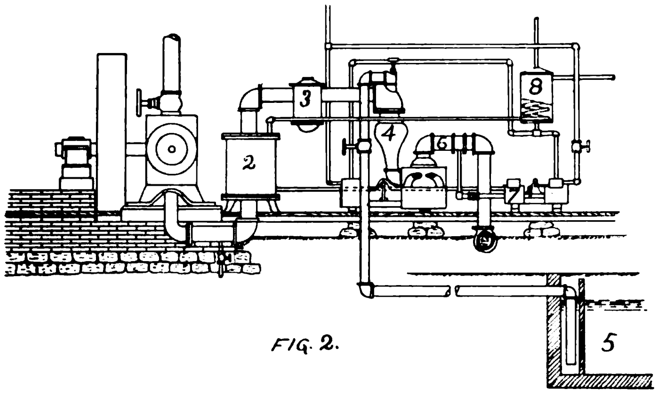


FIG. 2.

One advantage of this design of condensing plant is that a vacuum may be formed in the exhaust pipe before the engine is started, drawing air and water out of the cylinder and pipes, making less resistance for the piston to overcome when the engine is started.

Figs. 1 and 2 illustrate a simple condensing engine, in which steam is used in one cylinder, then exhausted to the condenser, but Fig. 3 is a cross compound engine in which steam is used in the high pressure cylinder *2*, then is exhausted and conveyed to the low pressure cylinder *3* by a pipe that is not shown in the cut.

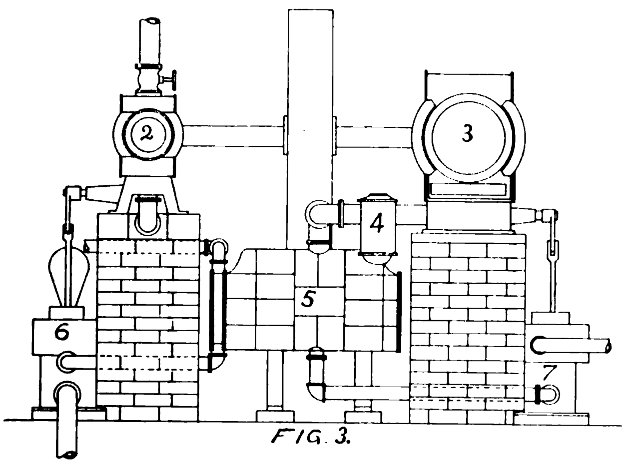


FIG. 3.

It then passes through the separator *4* to the surface condenser *5*, where it becomes water again and is returned to the boilers. As a surface condenser resembles a tubular boiler with a large volume of cold water traveling through the tubes, while steam envelopes them on the outside, impure water may be used for condensing purposes, as it is not mixed with that used for boiler feeding.

The circulating pump *6* forces water into the lower part of the surface condenser, sending it through one set of tubes to the opposite end where it turns and comes back through another set. This action is repeated through two other sets, after which it is discharged to the sewer. This pump is driven by direct connection to the high pressure side of engine.

The air pump *7* draws steam water and air from the low pressure cylinder, but inasmuch as the steam is condensed on its way, only water and air comes to the air pump which is driven by direct connection to the low pressure side of engine. As all water coming to this pump is pure, it makes no scale when fed into the boilers, but all that is sent out from the boilers in the form of steam does not find its way to the air pump, because some of it is lost through drips. Even when this small loss is made good with fresh water the resulting combination is pure enough to prevent formation of scale in the boilers.

(Concluded next month.)

"GRAPHITE."

This interesting monthly publication, issued by the Joseph Dixon Crucible Co., which is sent all over the country to machinery owners and engineers, was of especial interest in the April issue, for it shows pictures of many notable bridges and buildings in different parts of the world and contains some valuable information of paint as a preservative. It brings out the prominent part played by graphite as a preservation of both iron and wood in these modern times, for this indestructible mineral has been and is continually being used to paint some of the world's best iron and steel structures. The April GRAPHITE tells how the merits of graphite are separate and distinct in its well-known use as a lubricant and for preserving purposes, and copies will be sent free upon request to any one writing for same to the Joseph Dixon Crucible Co., Jersey City, N. J.—*Sugar Planters' Journal.*

A COMPOUND DYNAMO BRUSH.

A new type of dynamo brush has been brought out by Messrs. Svenska, of Stockholm, which the inventors believe has some important characteristics. It is known as the bronze-carbon brush, and it is formed by coating the particles of powdered graphite with copper. These coppered particles are then coated with tin, and the tinned particles are pressed together and heated sufficiently to cause the copper and tin coatings to combine to form bronze. Every particle of graphite powder receives a coating of bronze, but as the graphite particles are small, the brush is fairly homogeneous. It takes a polish, is easily soldered, and the twenty per cent. of free graphite present act as a lubricant. These brushes have practically the same conductivity as copper brushes, and, at the same time, they communicate as well as carbon brushes. In fact, they can be used to replace a carbon brush without any other change being required. At a peripheral speed of fifteen metres per second, and a current of ten ampéres per square centimetre, the loss of an ordinary carbon brush was found to be 34.5 watts, while with a similar bronze-carbon brush it was only 3.4 watts. The rate of wear of these brushes is slightly greater than that of metal brushes, but the wear on the commutator is correspondingly less.

—*Electrical Review.*

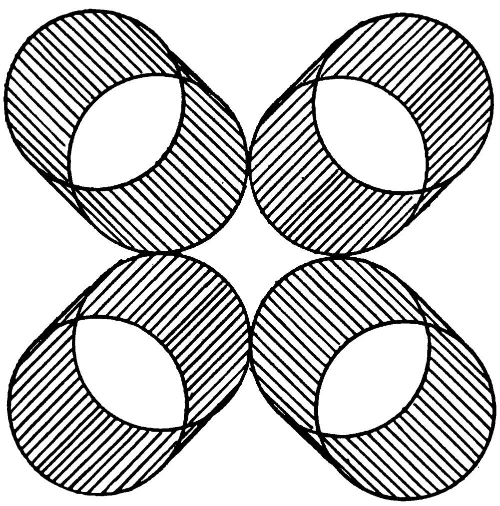
Of pens and pencils there is quite
A lot that can be said,
To drive a pen may be all right,
But pencils must be lead.

HOW TO CLEAN AUTO CHAINS.

Editor *Horseless Age:*—

First take chain off auto, then supply yourself with a tin can that will easily hold the chain and enough gasolene to cover chain. Have the can fitted with a screw top so it will not leak the gasolene. Put the chain into the can, then pour in enough of the gasolene to cover the chain about one inch deep. Screw the top on the can and shake the can until the chain is thoroughly clean. Take the chain out and soak it in a good lubricating oil until the oil has gone into the joints well. Or you can heat the oil slightly, which will aid a great deal. Take the chain out of the oil and rub off all the surplus oil from the outside. Then coat well with powdered graphite and put back on machine.—J. CLARENCE THOMAS.

The Dixon Company make a graphite compound specially for automobile chains.—*Editor.*



Among curious illusions, one of the most curious is the "ring trick." It consists of four rings, so drawn that if held a yard or two away and looked at steadily for a few moments it will appear as if they changed and turned inside out.

This is a difficult trick to explain. It is simply one of those strange deceptions which lead us to believe that while we are looking at an inanimate object it undergoes some inexplicable alteration.

ODD TOMBSTONE OF A PENCIL MAKER.

A German pencil maker, recently deceased, has over his grave a gigantic stone representation of half a lead pencil set as a tombstone. It is of red sandstone, with a core of graphite eight inches in diameter.—*Phila. North American.*

INWARD STILLNESS.

Let us, then, labor for an inward stillness—
An inward stillness and an inward healing;
That perfect silence when the lips and heart
Are still, and we no longer entertain
Our own imperfect thoughts and vain opinions,
But God alone speaks in us, and we wait
In singleness of heart that we may know
His will, and in the silence of our spirits,
That we may do His will, and do that only.

—LONGFELLOW.

THE ARISTOCRACY OF LABOR.

The skilled workman ranks high not only to his employer but also among his fellow men. The ranks of workmen are quick to note skill, favoritism, or poor judgment.

Mr. John A. Walker, the Vice-President and Manager of the Dixon Company, is always a careful reader of all that is written by Andrew Carnegie, and the following from Mr. Carnegie's new booklet entitled "James Watt," is contributed to August GRAPHITE by Mr. Walker.

"Writers upon labor, who have never labored, generally make the profound mistake of considering labor as one solid mass, when the truth is that it contains orders and degrees as distinct as those in aristocracy. The workman skilled beyond his fellows, who is called upon by his superintendent to undertake the difficult job in emergencies, ranks high, and probably enjoys an honorable title, a pet name conferred by his shopmates. Men measure each other as correctly in the workshop as in the profession, and each has his deserved rank. When the right man is promoted, they rally round him and enable him to perform wonders. When favoritism or poor judgment is shown, the reverse occurs, and there is apathy and dissatisfaction, leading to poor results and serious trouble. The manual worker is as proud of his work, and rightly so, as men are in other vocations. His life and thought centre in the shop as those of members of Congress or Parliament centre in the house; and triumph for him in the shop, his world, means exactly the same to him, and appears not less important to himself and his family and friends than what leadership is to the public man, or in any of the professions. He has all their pride of profession and less vanity than most."

A GENEROUS LOAN.

A Maine boy was sent to the grocery for some eggs. When he returned his mother looked in the basket and said, "Why Richard! I told you to buy a dozen eggs and you have brought me only ten." "I know it, mother," the boy replied, "but on the way home a fellow called me a lobster and I let him have a couple."

GRAPHITE FOR THE AUTO.

ASBURY PARK, N. J., May 13, 1905.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

GENTLEMEN:—

The sample of No. 635 came to hand and I have tried it in the cylinders of my car, in the crank-shaft and connecting-rod bearings, with very good results. The engine works much freer in every way, and I have cut down the oil supply from the mechanical oiler almost one-half.

I expect, as I continue to use it, it will glaze over the walls of the cylinders and the engine will run better still.

Before using the graphite I noticed the engine would turn over about four times after electricity was cut out, now it turns over about six times before it stops dead.

I certainly think it has been of great benefit to the motor.

Yours respectfully,
(Signed) W. N. G. CLARK.

A BIG INCREASE.

The sales of Dixon's Graphite Axle Grease at the end of the first six months of 1905 show an increase of *one hundred and thirty-seven* per cent. over the sales for the corresponding time of 1904.

No man who once carefully and intelligently tests Dixon's Graphite Axle Grease, will ever use any other if he can get Dixon's. It is well named "everlasting," and for economy and durability it is absolutely without a rival.

AUGUST AND AUTOMOBILES.

August, with its heat and dust, is a trying month for automobiles, whether air or water cooled. Those of much experience recommend the use of Dixon's No. 635 Graphite on exhaust valves and inlet valves. Heat has no effect on this graphite, but heat bakes oil and causes parts to clog.

Dixon's No. 635 Graphite is also recommended for lubricating sparker stems and many other working parts. Heat and dust plays "hob" with chains, and oil seems to do more harm than good, as it holds the dust and dirt. A good coating of graphite on a chain lubricates it thoroughly and prevents the dirt and dust from sticking. Some of Dixon's No. 635 Graphite in the crank case makes a smoother running engine.

The Dixon Company make various graphite products that are specially useful to the automobile.

NEVER TELL!

If you should learn of some dark sin,
Pray, never tell—
The truth may cause the tears to start,
The truth may break another heart;
The truth may tear two lives apart—
So never tell.

No harm is done through unknown deeds—
So never tell.
Some hearts know less of day than night,
Don't be the first to cause the blight;
Don't rob a life of sunshine bright—
So never tell!

The world is cruelly unjust,
So never tell—
If we but knew how hearts may break;
If we but knew how hearts may ache,
We'd leave them Hope for Love's sweet sake
And never tell!

—KATE THYSON MARR.

SAYINGS FROM THE PHILISTINE.

It is a great man who has the courage of his lack of convictions.

Life consists in moulting one's illusions.

There may be some substitute for good nature, but so far it has not been discovered.

Try these: a kind thought; a kind word; a good deed.

Don't scold, don't boast, don't parade, don't belliake. But live, love, laugh and do things worth while.

CONVERTED.

A few months back we received the following letter from a customer:—

ALBANY, South Dakota, Mar. 23, '05.

Joseph Dixon Crucible Company,
Jersey City, N. J.

GENTLEMEN:—Will you please send me your book on lubrication? I have been using your graphite for many years in all kinds of steam work, and have found it a very valuable lubricant. Strange to say, my partner, who runs on the other shift, and who is an old locomotive engineer, thinks that the use of graphite is injurious, and says that it cannot be used where the steam pressure reaches 160 lbs. Of course, I know that heat far higher than that of steam at that pressure has no effect whatever on graphite. I am certain that it is used in locomotive practice, though I am not a locomotive engineer. Please instruct me regarding this objection of my partner and if you will, send me two of your pamphlets; I will give him one of them.

Respectfully yours,
(Signed) H. D. DIBBLE.

Needless to say, we were very glad to forward the literature requested and wrote our friend, giving still more recent evidence of the truth of our claims for the high lubricating value and almost indispensable character of Dixon's Ticonderoga Flake Graphite. Then we received the following reply, which shows our correspondent to be a man of rare discernment and of keen understanding of the weaknesses of human nature.

ALBANY, S. D., April 9, '05.

Joseph Dixon Crucible Company,
Jersey City, N. J.

GENTLEMEN:—In reply to your letter, will say that my partner is converted, I think, as he is using three or four times as much graphite as I am. I say nothing to him as I do not care to "rub it in" in any way. The books were received and carefully read by me. Kindly accept my thanks for same. With best regards, I am,

Yours respectfully,
(Signed) H. D. DIBBLE.

"ALWAYS DIVIDE."

The author of "Susan Clegg," when at the age of nine, wrote a little tale which she aptly called "Always Divide." Here it is:

"A little chicken found a big fat nice worm; he ran as fast as he could to the chicken house for fear his brother would see him. His brother did see him. "You are real mean. Mamma said, "Always Divide." Now divide and I won't tell her.' Just then the mamma came up and said: 'Give me the worm.' Then she said as she ate the worm, 'Don't let me hear any more of this.'"

Brick says: "There does not seem to be a place in the modern plant into which the Dixon people cannot introduce their favorite product in some way or other." Selah, but this is so. There is not an industry on the face of the earth that cannot make profitable use of Dixon's Graphites.

SCHOOL SLATES.

It is estimated by good authorities that school slates will have entirely disappeared from the schools of the United States within the next ten years.

Paper pads and lead pencils are rapidly taking the place of slates because of sanitary reasons.

It may be accepted with the force of a moral axiom that, in any event, life must be lived radiantly, joyfully, nobly. Just so long as one lingers in conditions of doubt and depression, just so long will obstacles hedge him in, and limit and restrain his power. Supposing one has met wrong and injustice that he has endeavored to give of his best; that he has received the worst; there is still a way of accepting even such hard conditions as these without falling into irritation and morbidness. For one thing, it is a question whether, in the long run, we receive any discipline that we do not need; that we are not the better for accepting and endeavoring to take its lesson into the heart. Having once learned it, one does not need to learn it over again. That achievement, such as it is, is checked off for the rest of his life. Having learned it, the conditions that taught it will pass. Life is a succession of states that are due to a succession of choices.—*Boston Budget.*

COLOR DRAWING EXHIBIT.

The Joseph Dixon Crucible Company had an exhibit of color work in drawings at the recent meeting of the Eastern Art Teachers, held at Trenton, N. J. The parlors of the hotel were beautifully decorated and ornamented with specimens of work done by pupils in the public schools in different parts of the country. The exhibit was of work mainly from the Western States, although some most beautiful work was shown from schools in Brooklyn, particularly from the commercial high school on Bedford avenue, of which Mr. E. N. Reser is supervisor of drawing. Work was also shown coming from the girls' high school on Nostrand avenue, of which Mrs. Elizabeth Patterson is drawing supervisor. The work shown at these exhibits is steadily improving every year, and the teachers in many cities where the Dixon Crayons are used are loud in praise of their merits.

At the National Educational Association convention at Asbury Park a similar exhibit was shown in the parlors of the West End Hotel, to which all the visiting teachers were welcome.

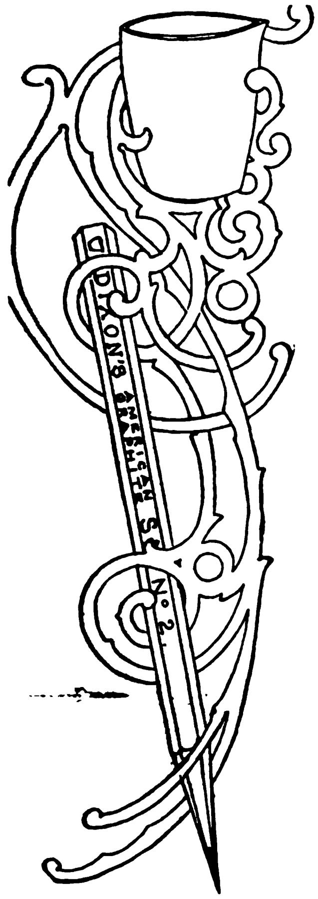
Mr Reed, manager of the educational department of the Dixon Company, and the originator of these exhibits, was there with his assistants from the Philadelphia office, and they did everything in their power to make the visit of the teachers at Asbury Park a pleasant one.

In this connection it is interesting to note that the Dixon Company has been awarded the contract for the city of Indianapolis for 36,000 boxes of crayons.

—*The School Journal* (*N. Y.*)

DIXON'S graphite publications are sent free of charge to all who are interested in the subject of graphite.

Graphite



VOL. VII. SEPTEMBER, 1905. No. 9.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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"OIL IN BOILERS."

In a paper on "Boiler Furnaces and the Effect of Oil on Their Ultimate Strength," recently read by Mr. D. B. Morrison, before the North-East Coast Institution of Engineers and Shipbuilders of England, the author said that if the surface of a furnace in a boiler for, say, 200 pounds pressure, were clean the temperature of the metal would never reach the point at which its original tensile strength would be appreciably reduced, even under very high rates of evaporation. If, however, the surface were simply rubbed over with a very thin coating of mineral oil, the temperature would at once rise to over 650 degrees, even with a moderate rate of evaporation. An appreciation of this fact would explain many a so-called "mysterious" collapse of apparently clean boilers. A disastrous accident of this nature came under his notice some time ago, in which the furnaces of a passenger steamer collapsed in mid-ocean. The boilers were apparently clean boilers, with no appreciable scale on any part, and the principal cause of the accident was the use of a very inferior oil for swabbing the rods and lubricating the auxiliary engines. The oil becoming emulsified with the feed water, and being therefore unfilterable, passed into the boilers and was deposited on the metal.
—*Electrical World and Engineer*, May 13, '05.

Pick up almost any of the steam engineering papers at random and the chances are quite favorable you will find mention of the evil of "bagging" of boiler sheets. Certainly the subject is one frequently enough discussed but, of the various causes to which we have seen bagging ascribed, oil upon the water surfaces is among the least considered. In how far the evidence collected by Mr. Morrison, can be used to explain a prevalent evil in boiler plants is a debatable question, but there is no doubt that the presence of lubricating oils in boilers is a many-sided curse.

In a paper read before the Institute of Naval Architects in England, to which reference has already been made in an earlier article in GRAPHITE, it was estimated that, roughly speaking, a film of lubricant 1/100 of an inch, a layer of boiler scale 1/10 of an inch thick and a steel boiler plate 10 inches thick, offer equal resistance to the passage of heat: that is, a layer of grease offers about 1,000 times, and a layer of scale about 100 times the resistance to the transfer of heat, as would a steel plate of equal thickness!

Here we have further evidence in support of the statements of Mr. Morrison, explanation of mysterious increases in coal consumption for fixed steam production, and guidance for the correction of evils and the attainment of greater economies.

Barring unusual cases, the foregoing remarks apply solely to plants where exhaust steam is condensed and returned to the boilers, but the point we wish to emphasize will interest all steam engineers, namely that it is possible by the use of Dixon's Ticonderoga Flake Graphite to sometimes entirely abandon, and always to greatly reduce the supply of oil for the internal lubrication of steam engines, thereby lessening the difficulty of keeping oil out of the boilers.

Graphite is an efficient and satisfactory lubricant.

It has been succesfully used as the sole cylinder lubricant of many steam engines.

Both theory and practice recommend its regular use.

It keeps cylinders and valves, rods and stems in a condition of high polish and great smoothness.

It saves packing and prevents leakage.

It wholly prevents cutting or wear of the parts.

It is readily separated from exhaust steam.

It does not lower efficiency of condensers.

It greatly helps to prevent the adhesion of boiler scale if introduced into a boiler.

It is valuable in preventing pitting, grooving or other forms of corrosion of boiler shells.

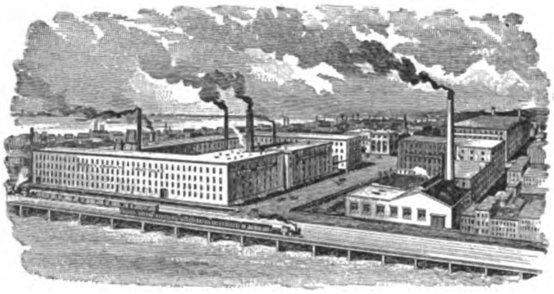
Its use is steadily increasing as engineers learn more and more of its valuable qualities.

It is the only lubricating graphite approved both by scientific theory and engineers' experience.

"SAGE COTTAGE."

"Sage Cottage" is located on the shores of Brant Lake, an historical, beautiful and restful spot ten miles west of Lake George, N. Y. "Sage Cottage" is the summer home of Mr. John A. Walker, Vice-President and General Manager of the Joseph Dixon Crucible Company. At the present time Mr. Walker is enjoying and benefiting by all the recreative features of his charming summer home, and at the same time planning for still further greatness and advancement of the Company which is so largely of his own creation.

ESTABLISHED 1827. **INCORPORATED 1868.**



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

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E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., September, 1905.

SUGGESTIONS FOR AN ELEMENTARY COURSE IN FREEHAND DRAWING.

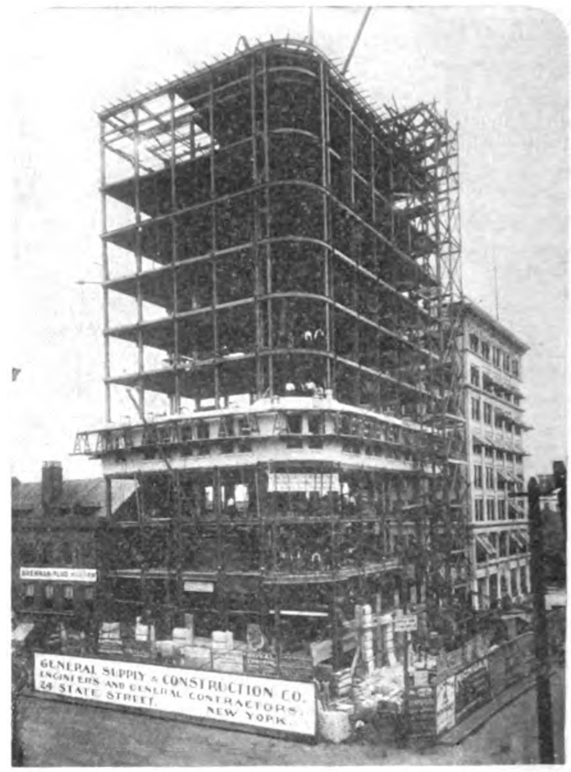
The beautiful publication of twenty-eight pages which is sent out under the above heading is not intended as a course in drawing, nor even as a system of elementary drawing.

It is, as its name indicates, a series of "Suggestions" arranged in a systematic manner, and written in untechnical language.

There are numerous illustrations, which are designed to be at least as suggestive as the text and which, if intelligently used by the teacher or student, should result in a knowledge of the elementary principles of freehand drawing and develop a love for the art itself on the part of the pupils.

The illustrations include the most simple outline forms and finished sketches. The drawings are in black and white and also in colors, and altogether the pamphlet is not only attractive and one which every teacher and pupil will be glad to possess, but one that is of most positive value.

The object in publishing this pamphlet is to more thoroughly introduce to teachers and pupils the merits of Dixon's American Graphite Pencils and Dixon's Colored Crayons, and under certain easy conditions the Dixon Company will furnish free of charge, any school district, any number of these "Suggestions" as the district can use to advantage.



THE NATIONAL BUILDING, SAVANNAH, GA.

H. W. WITCOVER, Architect.

THE GENERAL SUPPLY AND CONSTRUCTION CO., Contractors.

This building will be the home of the Savannah National Bank, and the Oglethorpe Savings and Trust Company. It is situated on the corner of Bull and Broughton Streets, which is the most prominent corner in Savannah.

The building is ten stories in height, with two mezzanine floors and basement. The details of construction indicate that it will equal in every respect any of the magnificent fireproof structures in New York City.

The architecture is decidedly graceful for a building of such great height, and reflects great credit on the ability of Mr. H. W. Witcover, Architect.

The General Supply and Construction Company, general contractors for the National Building, have made an excellent record in the construction of office and bank buildings in the South and Southwest. They maintain offices in different cities of the South, with headquarters at No. 24 State Street, New York City, which places them in a position to purchase building materials in different parts of the world at the best possible prices.

Mr. H. W. Witcover and the General Supply and Construction Company being well acquainted with the high standard of quality maintained for Dixon's Silica-Graphite Paint, selected this material for the two coats of paint that were used to protect the steel work of the National Building.

The National Building is nearing completion, and it will be the largest, highest and most complete modern building of its kind in Savannah.

DIXON'S graphite publications are sent free of charge to all who are interested in the subject of graphite.

THE SHIPPING COMBINE OFFICES, LONDON.

HENRY TANNER, JR., Architect.

These offices occupy the prominent site in Cockspur Street, looking down Pall Mall, and are almost opposite the Carlton Hotel. They are intended for occupation by the amalgamated lines of the International Mercantile Marine Company, Limited.

The architect for this building is Mr. Henry Tanner, Jr., who is to be congratulated on adding to the appearance of this part of London which is in such close proximity to Trafalgar Square and the National Art Gallery.

The contractors are the Waring-White Building Company, Limited, and the superintendent in charge of erection is their Mr. F. W. Nicholson.

NEW LACKAWANNA RAILROAD TERMINAL.

The wooden terminal of the Delaware, Lackawanna & Western Railroad at Hoboken, N. J., was destroyed by fire August 7th. Work was started several months ago on foundations for the new terminal to be erected in sections on the site of the then existing structure.

The architecture of the new terminal, as seen from the designs, is particularly attractive. Its construction will be of steel and concrete throughout. The exterior of the building will be covered with copper, finished in verdigris. The building will be 600 feet long on the riverside, with a depth of 200 feet, and an electrically illuminated tower 225 feet high at the southern end of the terminal.

Kenneth M. Murchison, Jr., Architect, of New York City, and Lincoln Bush, Chief Engineer of the Lackawanna Railroad, specified Dixon's Silica-Graphite Paint for all steel work to be contained in the new terminal of the Lackawanna.

The Fort Pitt Bridge Company, of Pittsburg, are now applying Dixon's Dark Red to the steel at the mill, and Snare & Triest Company, New York City, will apply Dixon's Olive Green for erection coat.

JUST A LITTLE MIX-UP.

There is a certain famous lawyer in Washington who devotes all his leisure time, says the *Post*, to the perpetration of elaborate and solemn jokes. Nobody is too august for him to tackle. He was in London last summer. One morning he went into a restaurant with his most dignified air and proceeded to order breakfast.

"I want two eggs," he said to the waiter. "I want one fried on one side, and the other fried on the other side."

The waiter nodded and withdrew. A little later he returned.

"Beg pardon, sir," said he, "but I am afraid I didn't quite catch your order. Would you mind repeating it?"

"Not at all," said the American solemnly. "I want two eggs, one of them fried on one side and the other on the other side."

"Thank you, sir," said the waiter. "I thought that was what you said, but I wasn't quite sure, sir."

Five minutes later the apologetic waiter returned again to the American's elbow.

"I beg pardon, sir," he said, "but the cook and I have had some words. Would you mind having those eggs scrambled, sir?"—*Forward.*

SOMETHING ABOUT CONDENSERS.

By W. H. Wakeman.

Chapter II.

When we consider the resistance removed by a condenser amounting to 12 pounds per square inch, it is found to be a large percentage of the total load, therefore the apparent saving in steam required is large accordingly, but this apparent saving is not all realized in practice.

For illustration suppose that the area of indicator diagram from an engine denotes a mean effective pressure of 24 pounds, while the resistance of the atmosphere is 15 pounds, making a total load of 39 pounds to the square inch. Attaching a good condenser reduces this by 12 pounds. The area of diagram remains the same, but the average forward pressure is less by 12 pounds because the resistance is lowered. In this connection we wish to call attention to the fact that the average pressure and the mean effective pressure are not the same, to consider them equal is an error.

In the above mentioned case the apparent saving is about 30 per cent., but this would not be fully realized in practice. Some of the steam supplied to the cylinder of an engine is always condensed and it is impossible to wholly prevent it. If it enters at a high pressure and corresponding temperature under conditions which give a short cut-off, expanding the steam down to a low pressure with corresponding temperature, the condensation will be excessive, because the next charge, coming to the other side of the piston, finds the cylinder with a comparatively low temperature, hence some of the steam is immediately condensed and lost in raising the temperature of cylinder. This refers to a simple condensing engine.

When an engine is designed so that steam is admitted at a high pressure, with a cut-off at, say one-third of the stroke giving a high pressure at the end of it, and this steam is exhausted into another cylinder which is much larger than the first, it results in the economical use of steam. This refers to a cross compound or a tandem compound non-condensing engine.

The addition of a condenser to this machine results in a large saving of fuel, because the temperature of the first cylinder is never lowered excessively, hence the condensation is light, and as the temperature of the second cylinder is never high, when the action of the condenser results in a low terminal pressure and corresponding temperature there is not much cylinder condensation, which saves steam, and this is the real object of the compound engine.

Furthermore, as the second cylinder is about double the diameter of the first, the area is four times as large, hence when 12 pounds per square inch of resistance to the advance of this large piston is removed by the condenser the gain in efficiency is correspondingly large.

When a condenser is operated by direct connection to the crank pin of an engine, or by a belt on the crank shaft, the power required to run the air pump must be supplied by the main engine, and as it may be overloaded, a plan whereby the air pump will be operated by an independent source of power, will prove beneficial.

This is found in the direct acting steam pump as already described and it is also found in the injector condenser as

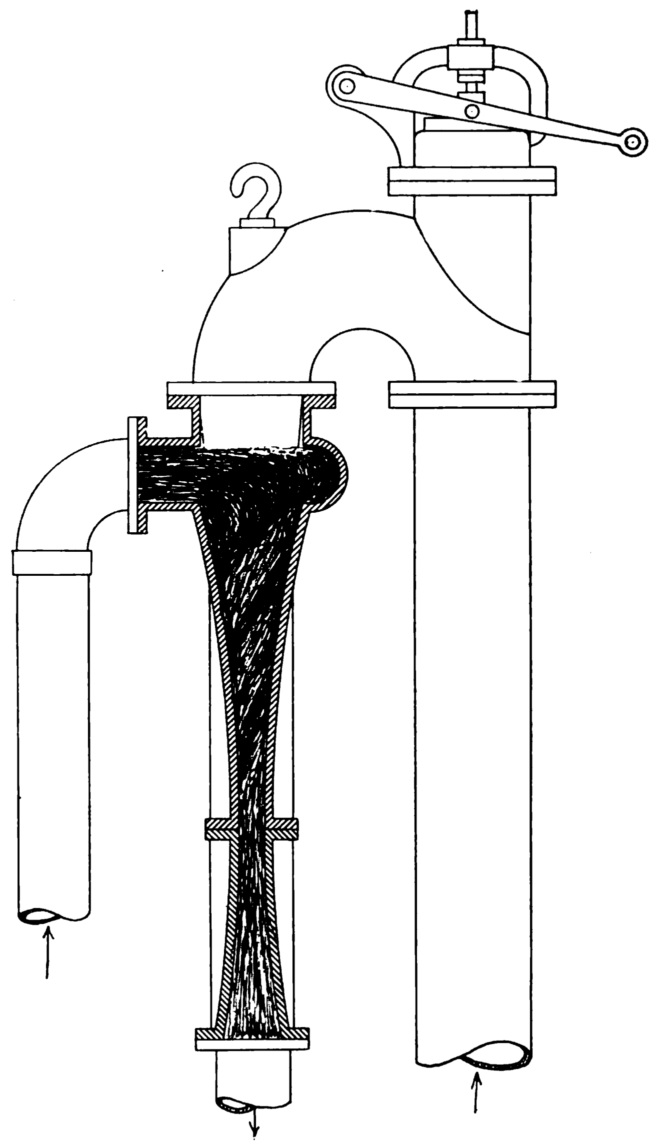


FIG. 4.

shown in Fig. 4. Water comes up through the left hand pipe and is discharged into the top of condenser, whence it passes into a contracted throat which imparts greater velocity to it. Exhaust steam passes up through the right hand pipe, is brought into contact with the water traveling at high velocity, (which in this case is given a spiral motion,) and is condensed. Steam that is condensed and the water used to condense it then flows down through the central pipe to the sewer.

Fig. 5. illustrates one of these condensers in operation, taking water from a flume located above the engine. This can be started in advance of the engine as follows: The inverted angle valve near the flume is opened, also the gate valve whose wheel is next to it. This valve admits water to the vertical pipe which discharges into the hot well below the engine room floor.

As the water level in the flume is higher than this connecting valve, water flows through it freely. As soon as these pipes are filled with water, the gate valve between the two vertical pipes is closed, consequently water is siphoned up to the condenser, drawn rapidly through it and flows down to the hot well as indicated by the arrows. This action creates a partial vacuum in the exhaust pipe, consequently when steam is blown through the cylinder to warm

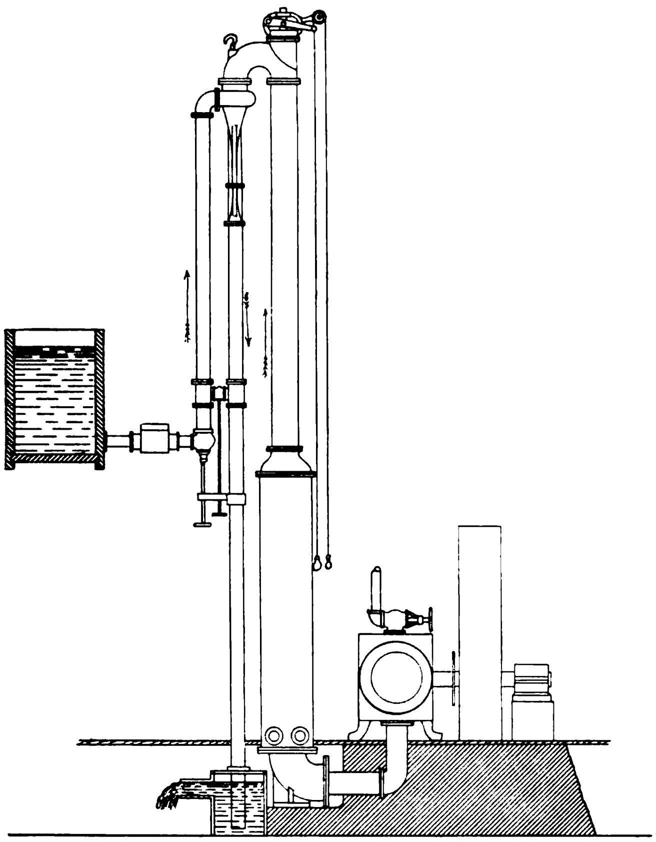


FIG. 5.

it previous to starting the engine, it is quickly condensed, and when the piston moves it does not have to overcome all resistance due to the atmosphere, as much of it is removed by the condenser. When the engine is running full speed this siphon will draw the water required as shown, and maintain a vacuum of 28 inches, so long as the condenser is not worked beyond its capacity. If for any reason the condenser fails to work, the relief valve shown at the highest point opens and allows exhaust steam to escape to the atmosphere. This valve may be opened by pulling on one of the ropes shown, and closed by the other.

A vertical heater is located between the engine and condenser, and in many cases proves a good investment. There is an inlet and an outlet connection at the bottom. The temperature of feed water is sometimes raised to 125 degrees by such a heater. It cannot be raised much higher, as exhaust steam is not very hot under such conditions.

Fig. 6 shows an injector condenser in operation where an elevated flume is not available for the water supply. In this case a steam pump is used to elevate the water required. Only a light service pump is needed in such a case. This is one form of a jet condenser, and if a separator is not used in the exhaust pipe all cylinder oil goes to the hot well from which water for boiler feeding is taken, but not much of it is drawn into the boilers because only a small part of the water coming to the hot well is required to feed them.

Fig. 7 illustrates an induction condenser which will lift all water required under same conditions. The entrance for exhaust steam is shown at *2*, while *3* is the free exhaust pipe to the atmosphere. The suction pipe of the condenser is shown at *4*, and the discharge to hot well at *5*.

If the engine carries a steady load, and the water does not have to be lifted more than 16 feet, it will work well and give satisfaction while lifting its full supply of water.

In order to start a condensing engine under these conditions, live steam must be admitted at *6* with valve in suction pipe *4* open. After water is lifted and circulated freely through the condenser, creating a partial vacuum in the exhaust pipe, the engine may be started. Shut the valve *6* and the exhaust steam will do the rest. When it is time to shut down it is only necessary to stop the engine, which causes the condenser to stop also.

In the case of an engine that is stopped several times per day this process is not very convenient, but there is no other reason why it should not be repeated indefinitely.

If the load varies more or less it will probably affect the condenser where all water is lifted, therefore it becomes necessary to supply one-third of it under a head of at least 25 feet, or a pressure of not less than 10 pounds. In this case when starting, turn on water at *6* and admit steam to the engine as usual. When shutting down stop the engine, then shut off water under pressure.

In cases where it is desired to start and stop the engine frequently without taking time to give attention to the condenser, all water must be supplied under 10 pounds pressure or more. It will then be admitted to the suction pipe *4* and there will be no use for the valve *6*. This water will be turned on before starting the engine, and shut off after it is stopped.

Before deciding to use a condenser the following points should be carefully considered. If all of the exhaust steam can be used to good advantage, it will not pay to condense

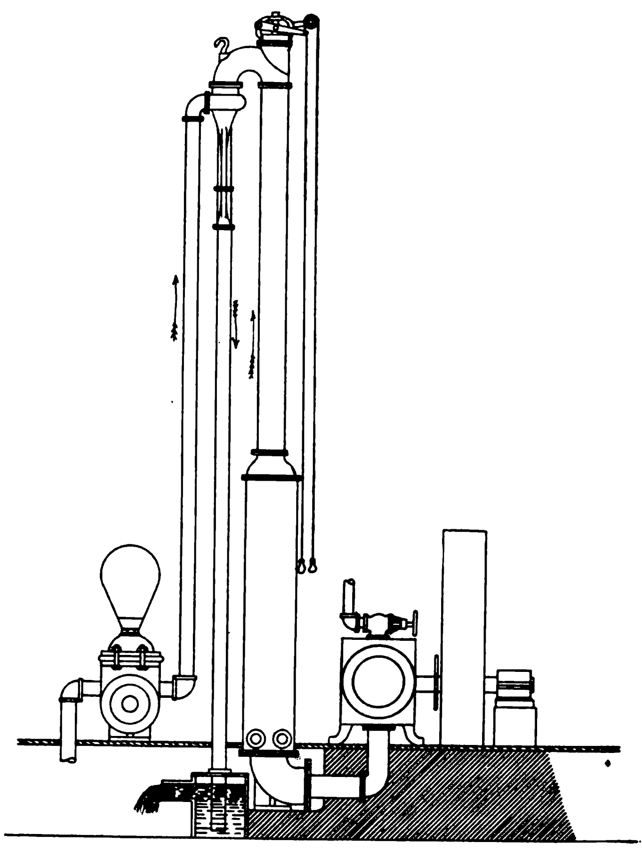


FIG. 6.

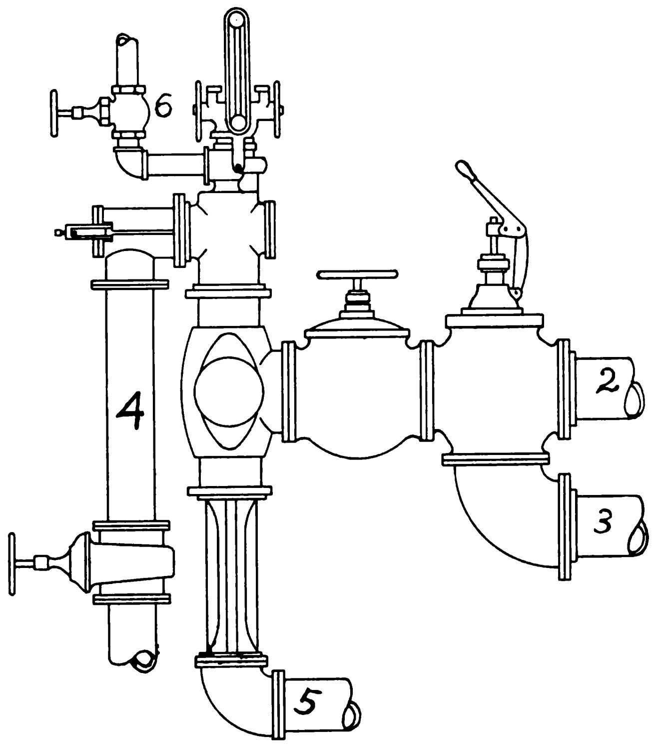


FIG. 7.

it. Where an engine is carrying a light load, and the exhaust steam is not used, it will pay to add a condenser, but the gain will not be as great as if the load were heavier.

When an engine is overloaded it will probably pay to add a condenser even if the exhaust steam is valuable, because some of the useless resistance will be removed, not only saving live steam, but causing the remainder to be used to much better advantage.

A small leak in the exhaust pipe of a non-condensing engine is usually of little or no account. The same leak after a condenser has been added will partially spoil the good results that would otherwise be secured, therefore all joints must be kept in first-class order.

Sometimes the owner of a non-condensing engine will decide to use a condenser. He proceeds to buy one and hires laborers to put it in place, although he is not an engineer, either by nature, training or practice. The result is frequently a disappointment, but if the matter was put into the hands of an expert, with certain results guaranteed or no sale, he would be much better satisfied, not only with the cost, but also with results secured.

OIL THAT COLD WILL NOT AFFECT.

Mr. P. S. Baker of Muscatine, Ia., contributes the following note to a recent issue of *Popular Mechanics*.

It is often difficult to keep machinery properly oiled in cold weather, as the oil freezes in the oil holes and the cups, and the oil upon the ways of the lathe and planer becomes stiff, causing the machines to work hard. A good oil for winter use is made by mixing graphite with cylinder oil until in a thick or pasty consistency, and then adding kerosene until it flows freely. This oil will not become stiff at 14 degrees below zero, and is valuable to those operating machinery outside or in cold shops.

DIXON'S SILICA-GRAPHITE PAINTS.

A Few Facts That the Dixon Company Takes Pride in and the World in General is Becoming Aware of.

In the manufacture of Dixon's Silica-Graphite Paint quality of product takes precedence of every other consideration.

The economy of quality is something the Dixon Company has always contended for and has very fully demonstrated.

While the volume of product of Dixon's Silica-Graphite Paint is large and constantly increasing, the Dixon Company has never made volume the prime object. The prime object has always been quality and one grade only,—no second grade to be offered where competitors' prices are to be met or to tempt unscrupulous dealers, painters or contractors.

There is no graphite paint made "just as good for less money." So far as the Dixon Company is aware there is no graphite paint made that is as good. The famous Ticonderoga flake graphite and silica form an unequaled pigment and no one outside of the Dixon Company has this pigment and we sell it to no other manufacturer. The Dixon Company sells graphite for the manufacture of graphite paints, and such graphite can be made into excellent graphite paints, but do not and cannot equal the celebrated Ticonderoga Silica-Graphite.

The oil used in the manufacture of Dixon's Silica-Graphite Paints is the best obtainable,—such as is approved by the highest authorities on durable paints.

The Dixon Company has endeavored to raise itself above competition in the matter of a protective and ornamental paint by producing an article that is the best that can be made and at the lowest possible price.

We are well satisfied with the result, and Dixon's Silica-Graphite Paint is known the world over and is the standard. It is made in four beautiful and durable colors and is used for ornamental as well as protective purposes.

If our readers are interested in this subject we shall be glad to send copy of April GRAPHITE, which contains illustrations of many handsome buildings on which Dixon's Silica-Graphite Paint has been succesfully used.

FROM FAR NEW ZEALAND.

PALMERSTON NORTH, N. Z., May 7, 1905.

DEAR SIRS:—Your letter and books to hand, and I have much pleasure in stating that they were very interesting indeed; I think Dixon's Graphite deserves all you claim for it. I know a good deal more about graphite and its uses than I did before. We have never used it as a lubricant, but we have used it with boiled linseed oil for joints, such as cylinder covers, etc., and it has never failed.

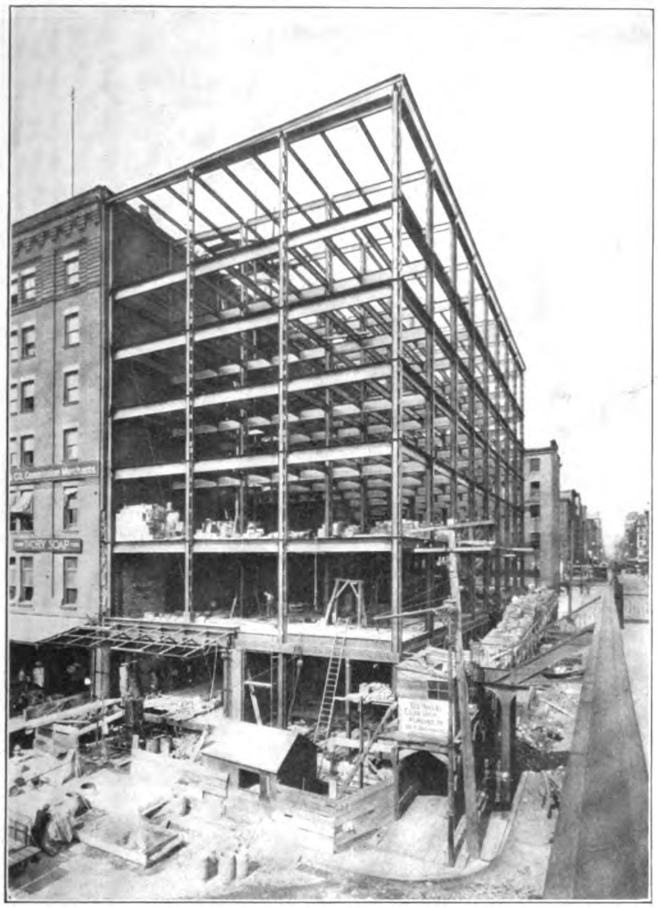
We have also used some of your compound for pipe joints, which is also very satisfactory.

These three things that I have used, crucibles, graphite and compound, do you great credit.

I shall never fail to put in a good word when I have the opportunity. I am,

Yours very truly,

(Signed) A. R. BUCHANAN.



MERCHANTS' WAREHOUSE, PHILADELPHIA, PA.

The illustration shows steel construction of a particularly well designed building for storage purposes. The architects, Messrs. G. W. & W. D. Hewitt, have combined strength and beauty in the architecture of this building.

Messrs. G. W. & W. D. Hewitt have distinguished themselves as architects for the largest and most elegant hotels in Philadelphia and Atlantic City.

The construction of the Merchants' Warehouse was entrusted to the firm of Messrs. Armstrong & Latta, general contractors, of Philadelphia.

Dixon's Silica-Graphite Paint was used to protect the steel work contained in this modern warehouse.

WE ZIGZAG TO TRUTH.

An eminent scientist has said that truth is arrived at in scientific research by zigzag courses. For example, never in science has there been such a radical abandonment of preconceived theories as in the last three or four years concerning the question of earthquakes and volcanoes.

It may be said with equal truth that during the past three or four years, there has been a great deal of shifting of opinions and deductions on the subject of graphite lubrication.

It is no longer considered that oils and greases alone are sufficient to meet the demands of heavy pressures and superheated steam.

The wonderful qualities of Ticonderoga Flake Graphite are recognized as something needed for the successful solution of the problems in lubrication of up-to-date engines and machinery.

THE DESIRABILITY OF DISPENSING ENTIRELY WITH OIL IN THE LUBRICATION OF INTERNAL COMBUSTION ENGINE CYLINDERS.

The chief engineer of the gas engine department of a large manufacturer of gas engines, writes us as follows:

"Oil in a gas engine cylinder is the greatest curse that we are pleased to class among necessary evils, and is only tolerated because no substitute for it has, up to the present time, been found.

"In the first place, it is very difficult to apply oil to the gas engine cylinders in such a way that it reaches all the surfaces to be lubricated, without considerable waste; in fact, it is an absolute impossibility to lubricate a gas engine cylinder without wasting considerably more than half of the oil.

"Lubrication in a gas engine cylinder must be effected entirely by spreading, while in a steam engine cylinder, lubrication is effected, to a great degree, by an atomization of the oil.

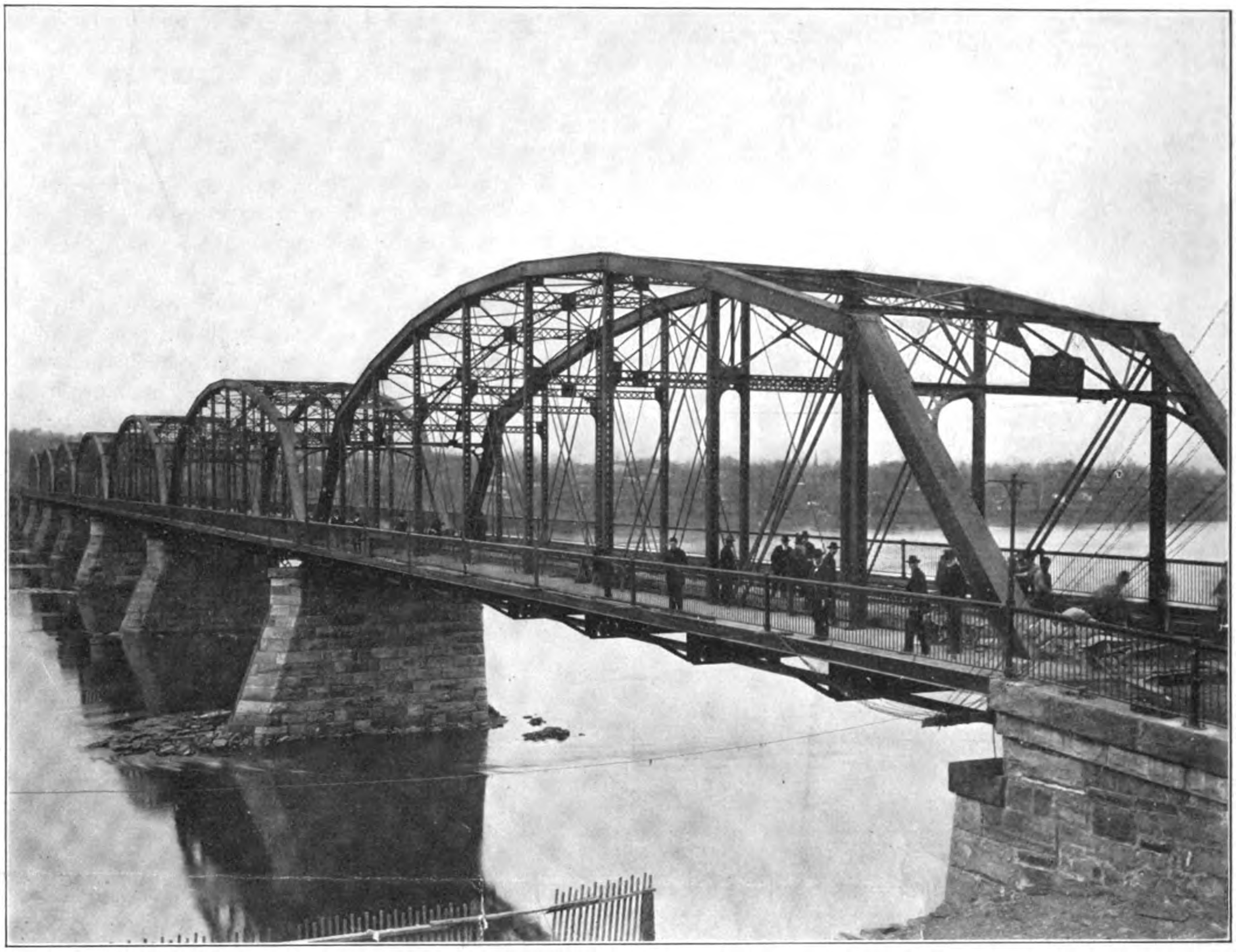
"Oil which is applied to a gas engine cylinder on the inhalation and compression strokes, is carbonized on the power and exhaust strokes, with the result that counterbores of cylinders, piston faces, cylinder head faces, inlet and exhaust valves, piston and packing rings and piston rods, in fact all parts which come in contact with the oil and heat, are coated with deposits of carbonized oil, which causes such parts as packing ring grooves and ring cuts to fill up with this carbon, giving no end of trouble and necessitating cleaning very much oftener than would be necessary if the use of oil could be dispensed with.

"In addition to the above troubles, this oil is thrown back into the counterbore, where it is carbonized, and coked, causing, in varying periods of time, pre-ignitions, due to the accumulation of this incandescent body. If the exhaust valve is placed in the bottom of the cylinder in such position as to allow this oil to pass out, its seat, and the top of the valve, would become recipients for the carbonized oil with effects very much more disastrous than though the carbon is allowed to rest in the counterbore of the cylinder.

"Again, igniter troubles can be traced, in a great measure, to oil accumulating around the insulation, as well as on the igniter, causing missing of impulse strokes, and becoming deposited on the points to such an extent as to prevent metallic contact.

"In addition to the above, the mechanism required for applying the oil to these cylinders is such (the quantity of oil delivered on each stroke being relatively small), that possibilities of erratic feeding are very great."

"Take the joys and bear the sorrows, neither with extreme concern,
Living here means nescience, simply; 'tis next life that helps to learn.
Life has worth incalculable; every moment that he spends
So much gain or loss for that next life which on this life depends."—BROWNING.



STATE BRIDGE AT DANVILLE, PA.

H. R. LEONARD, C. E.

The State of Pennsylvania in the past two or three years has erected a very large number of well designed steel bridges over rivers throughout the State.

The illustration shows one of the important bridges which has just been completed at Danville, Pa., from the design of Mr. Henry R. Leonard, Consulting Engineer, Philadelphia.

The King Bridge Co., of Cleveland, Ohio, erected this bridge in the prompt and efficient manner which is characteristic of this firm's building of notable bridges in different parts of the world.

Mr. Geo. S. MacLaurin, contracting painter for bridges and buildings, with headquarters in Philadelphia, was awarded the contract for applying Dixon's Silica-Graphite Paint. Mr. Geo. S. MacLaurin is a bridge painter of international fame, and is a very extensive user of Dixon's Silica-Graphite Paint, which he has repeatedly endorsed as being one of the very best protective coatings on the market.

The State of Pennsylvania and the City of Danville may well be proud of this bridge, as it is a most excellent example of engineering skill and the best quality of steel and paint.

DIXON'S graphite publications are sent free upon request.

FLAKE GRAPHITE AS A LUBRICANT FOR STEAM CYLINDERS.

A prominent officer in the Department of Steam Engineering of the U. S. Navy wrote:—"If the best results, viewed from the standpoint of boilers and condensers, as well as engines, are to be obtained, no oil should be introduced into any steam cylinder on board ship." He was advocating the use of flake graphite as a cylinder lubricant. Graphite has these advantages:

Flake Graphite has high lubricating value.

It is not affected by the highest cylinder temperatures.

It is not easily carried away from the wearing surfaces.

It imparts a permanent polish to valves and cylinders.

It assures smoothest operation of valves and pistons.

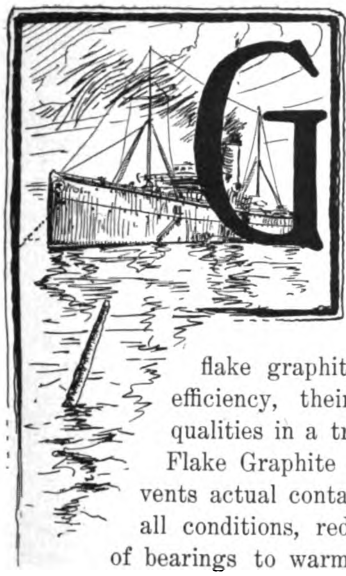
It lowers friction and prevents cutting.

It saves packing and stops leakage.

It has no injurious effect upon condensers.

It aids in preventing scaling and corrosion of boilers.

If you would be interested to look further into this important subject and to learn the extraordinary benefits obtainable by the use of Dixon's Flake Graphite as a steam cylinder lubricant, we will be pleased to forward you, free of cost, a copy of our booklet, "Graphite as a Lubricant," a valuable treatise covering the theory and practice of graphite lubrication, and to send you free samples of Dixon's Ticonderoga American Flake Graphite. Shall we send you this book and samples?



GREASE LUBRICATION is growing more and more popular because of its greater cleanliness, economy, efficiency and reliability. Searching tests and experiments, backed by many years of practical engineering experience, have clearly proved that the addition of pure flake graphite to greases adds to their efficiency, their endurance and wearing qualities in a truly remarkable degree.

Flake Graphite smooths the surfaces, prevents actual contact of bearing metals under all conditions, reduces the natural tendency of bearings to warm up and allows the use of lighter-bodied greases.

Only 4% to 6% by weight, depending on the circumstances, of pure flake graphite is necessary to double or triple the wearing qualities and endurance of the best plain grease on the market.

This addition of flake graphite, moreover, is a guarantee against countless "friction troubles."

Graphite cools bearings already hot, prevents further overheating, makes "cutting" impossible, saves delays and repairs, and removes the danger and disaster that may come of cut or "seized" pins and bearings, of cracked and broken shafts and journals.

It is economy, it is insurance against trouble and against danger to mix Dixon's Flake Graphite with all greases used on shipboard.

If you would like to look further into this attractive subject we will gladly mail you a copy of our booklet "Oil vs. Grease," which covers the subject in an interesting and instructive manner.

CONVINCED THE BOSS.

New Albany, Miss., June 27, 1905.

Gentlemen:—

Your favor of the 23d inst. at hand and contents noted, and in reply will say that I tested the samples of graphite and found them perfectly satisfactory in every way. I am a steam-shovel engineer and have always been aware of the merits of your flake graphite, but sent to you for samples to demonstrate the advantages of same to my employers and am glad to say that it made a very favorable impression. They immediately ordered one pound each of Dixon's Nos. 1 and 2 Flake Graphite, also one pound of Pipe Joint Compound for me. We have a pipe joint that has given considerable trouble on account of so much vibration and we have been unable to stop the leak with white or red lead, but over a week ago we applied Dixon's Pipe Joint Compound to the threads and it is perfectly tight so far.

Hoping this will serve to answer your inquiry, I remain,

Yours very truly,

(Signed) E. L. Jacoby.

THE STORMS OF WINTER.

Protect Your Steel, Iron and Other Metal Work Against the Storms of Rain, Snow, Sleet and Hail.

The weakening effect of rust on steel work and metal surfaces is a source of expense and annoyance to those who have not adopted thorough methods of protection.

It is the heat of the summer's sun that brings about most rapidly those changes which result in the loss of elasticity and protective power in protective coatings.

The rain and snow storms of winter with their excess of moisture, naturally result in the corrosion of metal surfaces on which the protective coating has been thus weakened by the heat of summer.

The higher velocity of the winds and the driving rain, sleet, hail and dust are specially destructive.

Paints applied in the fall dry about as quickly as in the summer, yet the complete oxidation of the upper portions of the film is not hastened as it is in the hotter days of the summer. Therefore the original elasticity is maintained longer and the coating is much more durable.

The clear dry weather and the absence of sudden showers of the fall season, provide conditions most favorable for the proper application and drying of paints.

Particular attention should be given to the selection of capable painters, the right kind of brushes and good paints.

Great care should be used in selecting good paints that will hold practically their original shade, and resist corrosive agencies for a long length of time.

The practical painter will tell you of the protective and wearing qualities of Dixon's Silica-Graphite Paint for all classes of steel work, roofs, fences, smoke-stacks and bridges. Time-tested for 42 years in different climates of the world, this paint has fully demonstrated its economical advantages in ease of application, good spreading and covering power, and wearing qualities.

The four Dixon Standard Colors are guaranteed to consist of correct proportions of the best pigments and linseed oil that can be used in paint making.

Dixon's Silica-Graphite Paint has the advantage of retaining practically its original shade during its long protective life. Provide in your painting contract that Dixon's Silica-Graphite Paint be purchased in the original packages, ready mixed for use. Then you will be sure of the quality of oil and pigments.

To all interested in Good Paint and Good Painting we will send free upon application, a copy of "Colors and Specifications," showing the four Dixon Standard Colors, with practical specifications for construction and maintenance painting. Address,

Paint Department,
Joseph Dixon Crucible Company,
Jersey City, N. J.

DIXON'S TICONDEROGA FLAKE GRAPHITE.

Those who are interested to look further into the important subject of Dixon's Flake Graphite as a lubricant may receive our booklet free upon request. Test samples also free to those desire them.

WILLIAM ELLIS COREY.

According to the New York *Herald*, William Ellis Corey is the largest employer of labor in the world, the commander-in-chief of an industrial army of 165,000 men.

A man whose own efforts lifted him from a salary of fifteen dollars a month, twenty-three years ago, to one by which, in comparison, the salary received by the President of the United States is small.

Mr. Corey is a man who most carefully keeps himself out of the public eye. When he walks the streets there is none to turn with the whisper, "There goes the highest salaried man in the United States." He can enter a theatre—and he does—and there is no craning of necks in his direction. He may go to his restaurant, the resort of men who profess to keep themselves informed, and there is not a whisper to mark his coming or going. His predecessor could do none of these without instant public recognition, and yet Mr. Schwab and Mr. Corey came to precisely the same position by similar methods from practically a similar beginning.

Mr. Corey is of English-German descent and is thirty-nine years of age. He was born at Braddock, Pa., the heart of the steel and iron industry. He is the son of a comfortably well-to-do merchant, now retired. He attended the public schools until he was sixteen years of age and then, just as the boys "down East" hear the sea calling them or the boys of every other section feel the inclination to start out for themselves, so young Corey felt the steel works calling him.

He started as an assistant in the chemical laboratory; he was in reality no more than a messenger boy, "bossed" by everybody. He is "bossing" many of those men himself now, and it does not argue so ill of him that they like him all the better for it.

He is known as the thirtieth "Carnegie Boy." Twenty-nine of the young men scattered through the departments of Carnegie's big mill, had been chosen, and he found the thirtieth of his Carnegie boys, when young Corey came under his notice.

Mr. Corey is not a maxim man; he hasn't any cut and dried ways of doing things.

When it comes to labor problems, he adds fair dealings to common sense; as some have put it, "common sense, fair dealing and no frills." He keeps close to his men at all times. He comes to his office each morning at about nine-thirty and he remains there until his day's work is done. Sometimes that means four o'clock in the afternoon, and sometimes six o'clock sees him still wrestling with some new phase of the business. But he remains there until his work is done. He does not like to carry his work away with him. As soon as he leaves his office he likes to think that there will be no United States Steel for him until the morrow, and in the meantime he stores up energy so that he does not have to call on the reserve.

Mr. Corey is now past detail work, and the thousand petty annoyances so vexing to the business man. He now busies himself with the larger responsibilities—the big things: operations, orders and finance, which come before presidents and general managers for judgment and to be passed upon.

By the time Mr. Corey reaches his office all of the regular business has been sifted, separated, dissected and distributed to the proper channels and departments.

Mr. Corey believes in out-door life. He is the owner of a large imported automobile which comes for him regularly, and he acts as his own chauffeur in driving it through the streets to his own home.

Walking stands first in the estimation of Mr. Corey as an exercise and a relaxation. He walks from three to five miles a day, usually, one might say, rain or shine. He believes that a good, sharp walk does as much to keep the nerves right and the muscles firm as anything that might be devised. His favorite time for this is in the morning, and as he has never succumbed to the urban custom of late rising, he usually walks the greater part of the distance to his office.

Sometimes, before the walk, there has been an automobile ride in the early morning up Riverside Drive over the viaduct to catch the cool breeze off the Hudson, and back to Claremont for a good, hearty breakfast, for Mr. Corey is a good eater, with never such a spectre as dyspepsia to haunt him.

Mr. Corey goes to the theatre to be amused and diverted. He is fond of music of the healthy kind, but not overfond. He does not care much for society.

In the fall he enjoys fishing and hunting at his club in the northern peninsula of Michigan. This club has six members. Mr. Corey spends his fall vacation there every year "roughing it"—the rougher the better, he says.

When Mr. Corey disappears into his preserve, the United States Steel Corporation loses track of him. There are no telephones and the telegraph is many miles away. This is the way he rests.

Every other year, there is a trip to Europe—a vacation also, and there the automobile comes into play again for long trips through the British Isles, or France, or Germany, or Italy.

Mr. Corey differs from the majority of millionaires. He is not particularly impressed with the importance of having a mansion on Fifth Avenue or on any other fashionable street. He frankly admits that he does not care particularly for art, and he is not making a collection of paintings, ancient or modern. Life has too many demands otherwise, he thinks, for him to waste his time deciding on the genuineness of some faded canvas, valuable only because it has outlasted time. He does not care particularly for reading—general reading, that is.

Indeed, there is only one class of reading that he may be said to enjoy, and that class is contained in the pamphlets, reports and papers put forth by the British and American engineering societies of which he is a member. When these refer to iron or steel, he devours them, masters them, and then assimilates them if they are of real importance. His business and his thoughts are iron and steel. For the other life, he believes too firmly in the efficacy of the open air to devote himself to reading, or art, or music. He is an advocate of open air and exercise.

All jointing of pipes, all tightening of bolts and threads should be done to come apart on demand. Dixon's Graphite Pipe Joint Compound will answer the demand any time, anywhere.

DIXON'S FLAKE GRAPHITE AS A CYLINDER LUBRICANT.

Dixon's Flake Graphite serves a purpose and fills a want in lubrication for which neither scientific theory nor engineering practice have discovered a substitute. Flake Graphite imparts a polish to bearing surfaces far smoother and brighter than the finest machine work, by filling in every minute pore and irregularity of the surfaces.

It forms a thin glaze or veneering that prevents contact of the metals and effects a very considerable reduction of friction.

As a cylinder lubricant, Flake Graphite is very widely used, either alone or with oils. It invariably brings a smooth, easy valve motion with steam-tight fit, giving cylinders and valves a wonderfully high polish. It never fails to cure groaning and laboring, and to reduce the amount of cylinder oil required. Piston rods are kept bright and true, and packing lasts much longer.

Where high pressures or superheating are employed, Dixon's Flake Graphite greatly simplifies the difficulties encountered in properly lubricating the cylinder.

The following testimonial emphasizes two points.

First:—The great benefits of Dixon's Flake Graphite as a Cylinder Lubricant.

Second:—The fact that only small percentages of Flake Graphite (two to six per cent. by weight, depending on the circumstances) are necessary for good results.

BAGNORE BRANCH MILL,
134 Ballinghatta Road,
CALCUTTA, Feb., 21, 1905.

Regarding my experiments with Dixon's Ticonderoga Flake Graphite, I beg to inform you that before using it I had only 22-inch vacuum and the engine was very hard to drive owing to the cold weather. I began by mixing one part of Dixon's Graphite with twelve parts of oil and fed that to the cylinders, through tallow cup. After a half hour's run the vacuum had gone up to 24 inches and the engines were running very easily. This improvement continued for four days with an average saving of fifty maunds (4,000 lbs.) of coal per day. Then I removed the cylinder heads and found rather more graphite there than was necessary, and came to the conclusion that I had been using too much. I therefore cut down the amount to one teaspoonful to a pound of oil and now the engine starts easily and runs smoother than ever.

I am also feeding Dixon's Flake Graphite to all the engine journals and find they run far cooler than before. I have certainly found Flake Graphite a great help.

Yours faithfully,

(Signed) ARTHUR A. ROGERS.

Not alone in steam engines are there great advantages to be gained from the use of Dixon's Ticonderoga Flake Graphite as a cylinder lubricant. In gas, gasoline and oil engines of all types, in air compressors, pneumatic tools and pumps, Dixon's Flake Graphite is equally useful.

Flake Graphite is the one never-failing cure for groaning, squeaking, binding, overheating and cutting, and all other manifestations of excessive friction. If used with regularity and judgment it proves an absolute guarantee against shut-downs or damage to machinery, traceable to imperfect lubrication.

Graphite immensely increases not only the lubricating value, but the endurance and wearing qualities of any oil or grease to which it may be added. Three to six per cent. of Flake Graphite by weight, depending upon the circumstances, yields the best results.

Dixon's Flake Graphite is ground in two different degrees of fineness to suit different conditions and to satisfy the preferences of engineers for a coarse or fine flake.

No. 1 is the standard or coarser flake.

No. 2 is the finer flake.

It is well to keep both kinds on hand, but be careful, in ordering, to state whether No. 1 or No. 2 is desired.

Buy only in original packages, bearing the red label, trade mark and name of DIXON.

A SURPRISED CARRIAGE MANUFACTURER.

And a Good Demonstration of the Lubricating and Lasting Qualities of Dixon's Graphite Axle Grease.

The following has just come to our knowledge:

A manufacturer of fine carriages sent a heavy family carriage to one of his customers. The ends of the axles have caps and the lubrication of the spindles is done with oil.

It is the practice of the manufacturer to send out all his carriages with the spindles well coated with Dixon's Graphite Axle Grease.

This practice insures perfect lubrication to the newly-made parts, protection from rust, and freedom from any drip of oil.

It is the habit of the manufacturer to instruct the customer to wipe off the graphite grease and then apply oil through the cap on the nut.

The carriage mentioned above was sold in June, 1904, and in November, 1904, the manufacturer was in the city where the customer resided and in speaking to him about the carriage, learned that the customer had never lubricated the carriage in any way.

The customer said he understood the salesman to say the carriage would not need lubricating at all. When the wheels were removed, the axles looked very dry, the grease having been worn away, but the spindles were nicely coated with the flake graphite.

The carriage weighs 1300 pounds, and the owner said it had always run easily and smoothly, even though it had been a hot and dry summer.

LUBRICANT FOR DRAWING DIES.

The following mixture has given very good results as a lubricant on drawing dies when drawing sheet metal: Boil together until thoroughly mixed, 1 pound of white lead, 1 quart of fish oil, 1 pint of water, and 3 ounces of graphite. Apply to the sheet metal with a brush before it enters the dies.

—JOS. M. STABEL, Rochester, N. Y.

TRINITY BUILDING, NEW YORK CITY.

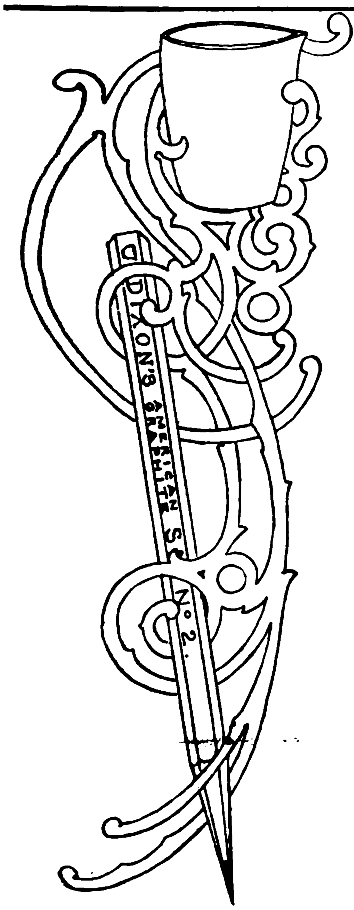
F. H. KIMBALL, Architect. **S. C. WEISKOPF, Engineer.**
GEO. A. FULLER CO., Builders.

Structural Steel Work is Painted With Dixon's Silica-Graphite Paint, Dark Red and Natural Colors.

Graphite.

VOL. VII. OCTOBER, 1905. No. 10.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



THE LIFE OF WIRE ROPE.

"The life of a hoisting rope depends largely upon its usage. If it be kept well lubricated, and no acid waters attack it, and if it be not wound over sheaves and drums of too small a diameter, it should outlast one where these precautions are not taken. A rope which is run at slow speed will undoubtedly last longer than if it were run at a high rate of speed under otherwise the same conditions. The number of trips a rope makes is an important factor also. It would seem that this is the real test of the durability of a hoisting rope, rather than the number of months or years the rope will last. A rope will deteriorate even if it is not used at all, for rust is almost certain to attack the interior strands, weakening the rope and in time destroying its capacity for usefulness."

The above quotation is taken from the columns of the *Mining and Scientific Press.* It brings out emphatically the necessity of guarding against the rusting and corrosion of wire rope by a coating of some lubricant which will not be washed off.

Dixon's Waterproof Graphite Grease was designed to provide exactly this protection. It is a strongly adhesive grease of high lubricating value and great wearing qualities which absolutely cannot be washed off by acid or alkaline waters and provides against wear, both external and internal, and against rust or corrosion.

Although it is useful for many kinds of machinery, Dixon's Waterproof Graphite Grease has won a great name for itself as a wire rope lubricant and has received the unqualified recommendation and preference of the foremost manufacturers of wire rope in the United States.

CORRESPONDENCE.

LISCOMB, Iowa, July 20, 1905.

I received the sample of Dixon's Flake Graphite and since then have obtained a supply and have had no trouble with "hot boxes." I have "got the habit" of using Dixon's Graphite and will continue to use it as long as such a thing as hot boxes exists. I gave a sample of Dixon's Flake Graphite to a few brother engineers and they have "got the habit" now.

Thanking you for the sample and wishing you a long and prosperous business, I remain,

Yours respectfully,

(Signed) C. M. MERRITT.

O. E. BURNS, El Diario, Buenos Aires, Argentine.

Extract from Letter June 17, 1905.

"I may state that quite a number of years back I had occasion to call on your house, and the gentleman who waited on me did so in such a cordial manner, in fact he went out of his way to do so, that anything that I can do for Dixon's Graphite will be to me a pleasure."

HARTFORD, Conn.

We wish to acknowledge receipt of the sample of Dixon's Automobile Graphite and also wish to say that we are using large quantities of same and we have had very good results. You have us as a life customer.

THE PALACE AUTOMOBILE STATION CO.,

Per C. A. Kingsley.

DANSVILLE, N. Y.

Please give me what information you can in regard to graphite lubrication for gasoline motors. I am running an Orient air-cooled machine at present and have had difficulties with lubrication. Please send me a sample of what you think would be adapted to air-cooled engines.

Respectfully,

(Signed) H. E. TOMS.

DANSVILLE, N. Y.

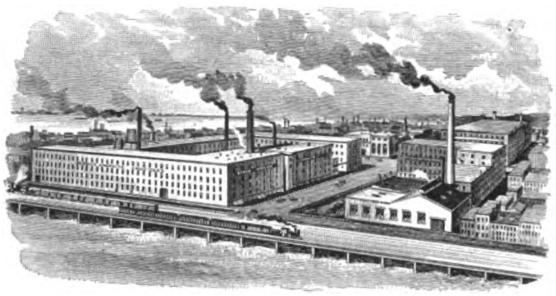
Replying to yours of the 11th, would say that I received the samples of graphite and mixed some of Dixon's Special Graphite No. 635 with my cylinder oil, and can say that my engine has never worked better since using it and graphite appears to be of decided benefit. Of course, I have not made very extensive tests as yet. I have already ordered some of Dixon's Graphite Motor Lubricants from my jobber, as my present requirements were only small.

Very truly yours,

(Signed) H. E. TOMS.

DIXON'S GRAPHITE PUBLICATIONS will be sent, on request, free to any address.

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Cophenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* **JOHN A. WALKER,** *Vice. Pres. and Treas.* **GEO. E. LONG,** *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George F. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., October, 1905.

COLOR SCIENCE.

Arranged for "The Master Painter."

Children under seven years of age almost invariably prefer yellow to all other colors, it is said.

Women, according to M. de Cnadolle, are more apt to have brown eyes than any other color, the proportion of that hue being 35 per cent.

Colors passing through a prism can be made to produce sounds. Green and red lights produce the loudest noises and blue and yellow the faintest.

It is said that dew will not form on some colors. While a yellow board will be covered with dew, a red or black one beside it will be perfectly dry.

Careful experimenting has shown that through a certain depth of water, where only 50 per cent. of the red rays passed through, there were 60 per cent. of orange; yellow, 80; green, 90; indigo, 95.

A writer in *Science* says that in ordinary cases of partial color blindness the color sensations that remain are blue and yellow, not blue and red, or blue and green, as is generally assumed and stated in text books.

There has been lately found on the Isthmus of Tehuantepec a flower which roughly does the work of a clock. In the morning it is white, at noon red and at night blue, the changes of color being remarkably regular.

EFFICIENCY.

Every man of any quality whatever has some choice work he would like to accomplish, some task he would like to perform and have it evident that he has performed it. The salesman wishes to suit everybody, and get all the business of his territory. The master mechanic sees a dozen things going wrong and wishes to think out the way to set them straight; the executive has a score of plans maturing and his heart is set on a successful result with them all.

Has the world ever been given a better kindergarten lesson in efficiency than in the success of the recent Russian-Japanese peace commission? The work is now done, the treaty is signed, but against what odds?

When peace was first broached the whole world said impossible—but six months has gone and it is accomplished.

When President Roosevelt first spoke, every European high official said in cold words, "go ahead, but it cannot be done." It is done. When the two Embassies started everybody said, "we wish you Godspeed—but you waste your time and force"—but it was not wasted. When the Ambassadors met it was in plump, hopeless mood, but the work is all done and well done. When the various snags of debate were reached, the same talk occurred. Every newspaper said—abandonment and a renewal of war, the only possibility—but it was not. During the last days the newspaper reports from the best authorities were specially hopeless, but in view of the result such hopelessness was a shame. At last the sun broke, the daylight came, peace was assured and all obstacles were removed. Why? Chiefly by the efficiency of the American President. His every move showed efficiency. He was bold, original, courted the impossible, liked the job everyone else said could not be done, trained his thoughts to the point at issue, was prompt, indomitable, would not fail, made his moves—till success came.

Here is a lesson for all with their tasks great or small. We challenge any man in America to-day to show that he has a job that is as difficult as this. Be efficient.

—JOHN A. WALKER.

GRAPHITE FOR RIFLES.

A correspondent sends us the following note regarding the use of graphite by a mining engineer located at Dawson, Alaska:

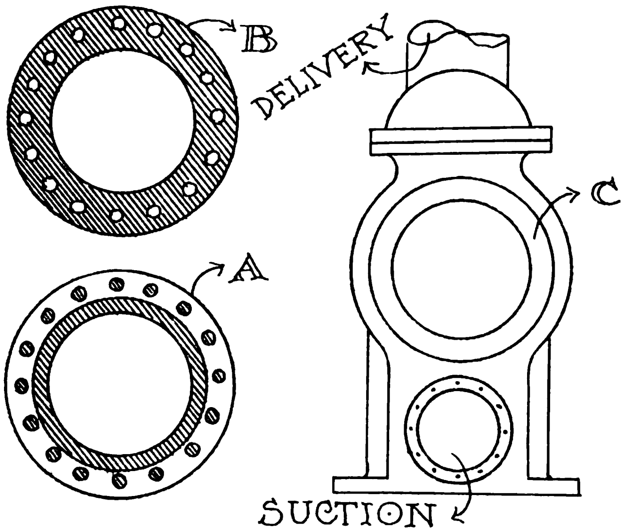
"I have hunted moose and caribou along the Klondyke river for three winters. One morning I had approached within about 150 yards of a large band of caribou. I was armed with a .30-40 repeater, and taking aim pulled the trigger; but there was 'nothing doing.' The temperature was 72 degrees below zero that day, and the oil on the lock and the firing-pin was frozen solid. Possibly you can imagine how I felt and what I said. You must know that things tighten up somewhat when its gets 65 or 70 degrees below. There was nothing to do but to go back to camp, where I took the gun apart, thawed out the oil and wiped it off, coated all the parts freely with Dixon's Fine Flake Graphite, and then a better working gun you never saw. I went out every day after that and never once did my rifle refuse to work."—*Shooting and Fishing.*

CYLINDER HEAD GASKETS.

It seems to be a simple matter to secure a tight joint between cylinder head faces by using gaskets such as are to be found in stock most anywhere. A case came recently to my attention where an engineer was having his troubles trying to keep a joint tight on a cylinder head on the water end of a high duty pumping engine.

The method of applying the gasket is shown at *A* in the accompanying illustration. I was present when the cylinder head was removed and saw that the gasket, after having been in use a short time, had a frayed or chewed up appearance.

Another gasket, treated on each side with white lead, was inserted and the pump started up. Investigation showed



that there was a perceptible movement of the head outward, a sort of a breathing action; though slight, it enabled the water to escape between the gasket and head.

To remedy this state of affairs, a gasket similar to that shown at *B*, was made, treated to a coating of graphite and cylinder oil, and inserted in place. Although the breathing action of the cylinder head continued, the new gasket made a watertight joint and has been in use some time with good results. —OLEAN in *National Engineer*.

Mr. J. W. Wilcox, of Boston, was the real inventor of electrotyping as at present practised, for he was the first to conceive the idea of taking a mold in wax of the object to be duplicated. Previous to this time, Mr. Joseph Murray had discovered that non-conductive surfaces could be metalized by giving them a film of graphite, and a little later Mr. Silas Knight invented the process now universally employed of quickening the deposit by precipitating on the black-leaded surface of the mold a film of copper through the use of iron filings. The modern process of electrotyping is, therefore, a combination of discoveries and invention. First, the discovery that copper could be deposited from its solution by electricity. Second, that objects could be duplicated from their wax molds. Third, that wax molds could be made conductive by polishing them with graphite, and fourth, that the deposit could be quickened by first precipitating a film of copper on the mold by the chemical action of iron on the sulphate of copper solution. This is all there is to electrotyping. We have been working at it for sixty years, and we are still molding in wax, polishing with black-lead and precipitating with iron filings. Of course, we have made many improvements in machinery. We use dynamos now and do work in one hour which formerly required twelve. Hydraulic presses have taken the place of hand presses. We black-lead by machinery, and power machines perform all the hard labor of the foundry, but no basic change has taken place, and all these years there has arisen no greater man than Wilcox.—*From History of Stereotyping and Electrotyping, by C. S. Partridge.*

THE BREAKFAST FOOD FAMILY.

John Spratt will eat no fat,
Nor will he touch the lean,
He scorns to eat of any meat;
He lives upon Foodine.

But Mrs. Spratt will eat none of that;
Foodine she cannot eat.
Her special wish is for a dish
Of Expurgated Wheat.

To William Spratt that food is flat
On which his mater dotes.
His favorite feed—his special need—
Is Eata Heapa Oats.

But Sister Lil can't see how Will
Can touch such tasteless food.
As breakfast fare it can't compare,
She says, with Shredded Wood.

Now, none of these Leander please,
He feeds upon Bath Mitts,
While sister Jane improves her brain
With Cero-Grapo-Grits.

Lycurgus votes for Father's Oats;
Proggine appeals to May;
The junior John subsists upon
Uneeda Bayla Hay.

Corrected Wheat for little Pete;
Flaked Pine for Dot; while "Bub,"
The infant Spratt, is waxing fat
On Battle Creek Near-Grub.

—*Chicago Tribune.*

THE action of Dixon's Ticonderoga Flake Graphite is that of filling up the minute "low spots," scratches and the rough grain of the metallic surfaces, forming thereby a perfectly even, tough glaze of exceeding smoothness on the rubbing surfaces, which reduces the necessity for more than a relatively small quantity of oil or grease.

Abrasion of a bearing surface thus coated is impossible. Every user will benefit by testing a sample.

NOTES ON TESTING A STEAM PLANT.

By W. H. Wakeman.

Chapter III.

The objects sought in presenting this matter are to show that testing a steam plant to determine the friction load, also the amount of coal used per horse power per hour, is not such a difficult matter as it appears to engineers of limited experience, and to tell how this friction load was reduced without making any change whatever in the arrangement of shafting or machines, or in other words without expense, except the time required to make a test.

While it is desired to show the simplicity of such tests, it is also expected that due consideration of the matter herewith presented will impress upon the steam engineer the absolute necessity of using great care in doing such work in order to make it of any value whatever. The latter idea is suggested by reading the reports of imperfect and carelessly made tests which are misleading, therefore they are worse than useless.

The conditions were as follows: The speed of some of the machinery in a certain shop was speeded higher, more material was removed during given operations, and more machines were added until the engine could no longer maintain its required speed.

As the boilers were old it was not safe to increase the pressure on them, and as they were already worked to their full capacity under prevailing conditions, it was not practical to increase the speed of engine.

Of course it is always easy in such cases to say that new boilers must be provided in order to carry a higher steam pressure, but this plan is much more easy to formulate than to put into practice where the firm is not prepared to invest more money in their plant.

Due consideration of the way in which this plant was operated caused me to conclude that there was a chance to reduce the friction load, therefore the first move was to find out exactly what this load was, which was done as follows:

The superintendent made arrangements whereby all belts in the shop were to be run on to loose pulleys at a given signal, during regular working hours, and kept there long enough to allow for taking three or more indicator diagrams. This plan appeared practical, but when an attempt was made to prove it, the result was a failure because it was impossible to procure three pairs of diagrams alike, therefore I could not decide which pair represented the correct friction load.

The next attempt was made at noon time when all machines were supposed to be idle. The engine was started but it was not possible to secure three pairs of diagrams on which the mean effective pressure would agree, therefore the trial proved a failure. In both cases it was due to the fact that when the workmen found the shafting in motion, they would start up some of the machines in order to use the power, as they had contracts for doing piece work, consequently were anxious to make as much as possible.

While these results were very annoying, they did not prevent another trial which proved successful. This was made at night, when there was nobody in the shop, except the watchman. It was now an easy matter to secure three pairs of diagrams alike, thus showing that conditions were right for determining the exact friction load, which was found to be 49.22 horse power.

As these diagrams are interesting a pair of them are shown in Fig. 1. The plan adopted to reduce the area of diagrams taken with the friction load or alone, or in other words to dispose of a portion of the friction load which was excessive, was as follows:

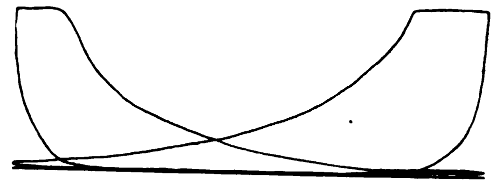


FIG. 1.

The bearings in this shop were intended for oil and were fitted with common glass oilers in which an inferior oil, costing about 15 cents per gallon, had been used. They were cleaned and filled with a superior grade of engine oil supplied by The Vacuum Oil Co., at 50 cents per gallon. This oil was used for more than one week before the test was completed in order to be sure that none of the poor oil remained.

The cylinder oil used in such a case required attention as being an important factor. I found it to be a very good, clean oil sold by a prominent firm, but inasmuch as the valve rod on the engine, which was of the Corliss type, vibrated badly, this oil was evidently unsuitable for that engine. It was replaced by a brand sold by the above mentioned firm, known as 600 W., and for several days Dixon's Flake Graphite was mixed with it until the vibration of valve rod was greatly reduced, after which the oil alone was sufficient to secure smooth operation.

Having made these changes in the lubrication of the shafting and loose pulleys in this shop, the test was completed to determine the friction load under new conditions and it was found reduced to 38.39 horse power. No other changes had been made and the same method was adopted as above described, as diagrams were taken when there were no workmen in the shop. These are illustrated in Fig. 2.

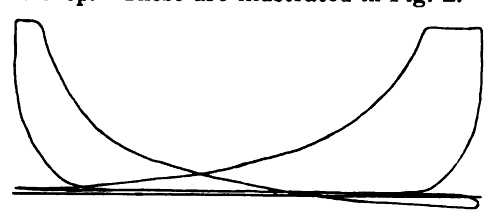


FIG. 2.

The reduction of the friction load was 49.22—38.39= 10.83 horse power, or 10.83÷49.22=22 per cent. Many firms have spent hundreds of dollars in efforts to reduce their friction load, and some of them have not secured results equal to this in which not a pulley nor a piece of shafting was moved.

Another point to be determined was the average power required in this shop, and for this purpose a pair of indicator diagrams was taken by my assistant engineer from the engine once in 15 minutes during a day of 11 hours, or a total of 88 single diagrams, which I carefully measured with a planimeter and having found the mean effective pressure

of each, they were added together and the sum divided by 88, giving an average of 32.29 pounds.

As the horse power constant of this engine is 2.3868 it averaged 2.3868×32.29=77 horse power for that day, which was considered a fair specimen on which to base a calculation. Fig. 3 illustrates a pair of these diagrams.

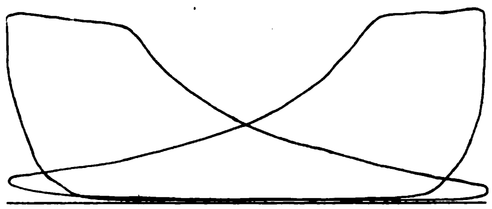


FIG. 3.

Steam for this engine was supplied by a pair of tubular boilers with grates 4.5 feet square, therefore each contained 20.25 square feet or 40.5 for both.

At 7 o'clock in the morning these fires were burned low and nicely levelled, as their exact condition could be more carefully noted in this way, than with thick fires. During the run of 11 hours 2,640 pounds of coal were used, leaving the fires just as they were at the beginning of the test, after which they were banked.

This is 2,640÷11=240 pounds per hour. As there were 40.5 square feet of grate surface, combustion was maintained at the rate of 240÷40.5=6 pounds nearly, per square foot, per hour, which is admitted to be a low rate.

As 240 pounds were burned per hour, and 77 horse power was developed, the consumption of coal was 240÷77=3.12 pounds of coal per horse power per hour, or per horse power hour.

It will be noted that this is not a boiler test, therefore the weight of water actually evaporated is not required, neither does it take into account the weight of clinkers and ashes. It was a simple yet accurate test to determine the amount of coal, taken as delivered from the yard, it required to develop one horse power for one hour. For a simple non-condensing engine under normal conditions, this is a good record.

As the plant was run eleven hours per day and 10.83 horse power was saved, it amounts to 10.83×3.12×11=371.68 pounds per day. This coal costs about $3.75 per gross ton, or 3.75÷2,240=.001674 dollars per pound, therefore the saving is 371.68×.001674=.62 dollars or 62 cents per day.

As already stated, the engine oil substituted for the inferior brand formerly used was more expensive per gallon. The new cylinder oil cost about the same as the old, but only one-third as much of it was required to do better work, therefore the actual cost of the change was nothing, leaving a clear gain of 62 cents per day after paying the cost of time required to make the test.

A much greater saving was made by removing the overload from the engine, resulting in more uniform speed and more revolutions per minute, but this does not appear in the calculations made.

The total average load was 77 and the friction load 49.22 horse power, therefore 64 per cent. of the whole was required to turn the engine and shafting before the change. It was reduced to 50 per cent. by providing better lubrication.

ARE YOU EDUCATED?

According to the New York *World*, Professor Frank J. Miller, examiner of secondary schools, said, at the Junior Chapel of the University of Chicago, a short time ago, that only those who can answer all of the following questions in the affirmative, are educated:

Has education given you sympathy for all good causes? Has it made you easier to interest in them? Has it made you public-spirited, so that you look beyond your own dooryard and take interest in a clean city?

Has it made you a brother to the weak?

Have you learned the proper value of money and time?

Have you learned how to make friends and keep them? Do you know how to be a friend yourself?

Can you look an honest man or pure woman straight in the eye?

Do you see anything to love in a little child?

Will a lonely dog follow you in the street?

Can you be high minded and happy in the drudgeries of life?

Can you think washing dishes and hoeing corn are just as compatible with high thinking as playing the piano or playing golf?

Can you be happy alone?

Are you good for anything to yourself?

Can you look out on the world and see anything but dollars and cents?

Can you look into a mud puddle and see the blue sky reflected? Can you see good in everything?

Can you look up to the sky at night and see beyond the stars? Does your soul claim relationship with the Creator?

Prof. Miller said the failure to answer any of these questions affirmatively is enough to send the man or woman who thinks he or she knows it all back among the uneducated.

"The college curriculum does not contain all that is necessary to the educated man," said Prof. Miller. "A man may be graduated and go out into the world and still prey on society, notwithstanding his so-called education."

DIXONIC UBIQUITY.

The Joseph Dixon Crucible Co., of Jersey City, N. J., is trying to prove to the world that the Dixon pencils may be le(a)d and driven at the same time. This is paradoxical, but their users seem to have no difficulty in performing this wonderful feat. The company has just issued GRAPHITE for August, containing an excellent article on "Competition and Salesmanship," and the thrilling experiences of R. A. Brown, a globe-trotting Dixon salesman. The company receives letters from all parts of the globe, three having been received recently from places so remote as Greencastle, Tyrone, Ireland, Seoul, Korea, and the Island of Mindanao, Philippine Islands. The Dixon pencils, besides having a good point, enable people to draw the line when required. The company's literature can be obtained on application. When you write, mention *Brick*. —*Brick.*

DIXON'S GRAPHITE PUBLICATIONS are sent, upon request, to any address free of charge.

THE CHAPMAN AUTOMATIC GRAPHITE CYLINDER LUBRICATOR.

It Feeds Dixon's Pure Flake Graphite and Cylinder Oil, or Cylinder Oil Only, and Is Intended for High Pressure and Superheated Steam Engines, Blowing Engines and Gas Engines.

This lubricator has been designed by Mr. L. Chapman, M. I. Mech. E., and is manufactured in England by skilled mechanics, under Mr. Chapman's direct supervision. Each lubricator is tested before leaving the shop by a good run, pumping thin spindle oil against a pressure of 500 pounds per square inch.

Later on we shall have something further to say concerning this lubricator, and shall also show drawing and go more generally into details.

The Chapman Lubricator is not a new nor an untried device. It has been on the market for several years, during which time it has done good work, but it is now proving far more satisfactory as its weaknesses have been eliminated and many improvements have been added. Time and experience, as they usually do, have shown wherein improvements might be made and such improvements, when found worthy, have been added.

It is claimed that the Chapman Lubricator saves two-thirds of the oil.

That it reduces by two-thirds the oil in the boiler feed.

That it decreases by two-thirds the grease in the condenser.

That it puts an unctuous bloom on all rubbing surfaces and rods.

That it protects and prolongs the life of packing.

That it decreases internal friction.

That it makes the engines run smoothly and quietly.

That it reduces the wear and tear of both engines and boilers.

That it increases the effective horse-power.

It is further claimed that the lubricator will feed against any pressure.

That it gives the graphite no chance of settling.

That it provides for instant variation of feed.

That the lubricator is refilled without interrupting the lubrication.

That it delivers constant proportions of graphite and oil.

That it handles any consistency of fluid lubricant.

That it is positive in action.

That the lubricator is fitted with pulley or ratchet drive, and is made to suit any size and speed of engine.

All these claims, it is said, have been fully substantiated and proved beyond any question.

The problem of modern lubrication is to find a substance that will combine great smoothness with ability to endure heavy pressures and high temperatures.

The thickest and best cylinder oil becomes thinner than water when in the presence of high pressures and superheated steam, and is easily squeezed out from between the surfaces it is intended to lubricate.

It is for this reason that the addition of one-eighth of a pint of Dixon's Flake Graphite to the quart of cylinder oil, or six per cent. by volume, increases the lubricating power and reduces the consumption of oil in cylinder lubrication.

There is no substance so smooth as pure graphite. It is the best lubricant known to science and practice. It is not affected by heat or cold, acids or alkalies.

Graphite coats all bearing surfaces with an unctuous veneer, fills up the pores of the metal and all roughness and abrasions, and renders the surfaces so smooth and silky that they run together with a minimum of friction.

There is no graphite so enduring, so uniform and so generally satisfactory as Dixon's pure Ticonderoga Flake Graphite, and this is the graphite that is recommended for use in the Chapman Lubricator.

It should be borne in mind that graphite, even when in a state of finest subdivision, is still a solid and the proportion should not exceed one-eighth of a pint, or, say, one ounce of graphite to the quart of oil.

THE "LEISURE CLASS" IN COLLEGE AND BUSINESS MANAGEMENT.

College and Business Managers Who Work too Many Hours and Who Do the Detail Work, Have Not the Opportunity to Properly Think and Plan for the Institution Under Their Charge.

A celebrated professor, in a speech at a dinner given in his honor said:

"Don't work your professors so hard, but give them a little more chance to think."

"The difference between a college and a university," he went on to say, "is that between a youth and a man. Much money is needed to establish a college on a university basis, I admit, but also some other things, the need of which is not so generally recognized here. To produce a great university, you must have a sort of leisure class within the institution. A man who works six or eight or ten hours a day teaching and lecturing, can do no great amount of original thinking. What we want most of all in our universities is not men to teach, but men to think. You cannot teach hard and think well at the same time.

"It would be good indeed if our American universities followed the example set by such institutions in Germany and in England, by not working their professors quite so hard, and instead giving them more time to think."

It may be said with equal truth that the managers of many of our large manufacturies and business houses work too hard and think too little.

It is true we need men to work out all the details of an institution—from the messenger boy to the superintendent.

It is necessary to have capable men to think and plan for all these workers, and a still greater need is a few still more capable and experienced men to plan for the future of the institution. Men with leisure and opportunity to consider all the things which seem to bear on the future prosperity of the institution—the enlargement of the plant—and to what extent. The sources of supplies of raw material. The markets for manufactured goods. The establishment of agencies and branches. The selection of competent heads of departments, and the protection of the industry and the institution against unfavorable laws and competition, so that no competitor may become a dangerous rival and possibly greater than the parent institution.

Business managers who take upon their shoulders too much of the detail work—work that might be equally well done by assistants or clerks, unfit themselves for careful thinking and planning for the welfare and growth of the business for which they are managers.

AN OLD TIME PLAY.

With a Suggestive Title.

PARK THEATRE

Lessees and Managers........Messrs. W. STUART & OAKEY HALL
Director........................Mr. CHANDOS FULTON
Treasurer..........Mr. F. A. SAYER | Stage Manager..........Mr. J. C. PADGETT
Leader of Orchestrr. Mr. H. WANNEMACHER | Prompter..............Mr. J. P. COOKE

Every Evening at 8, and Saturday Matinee at 2,

THE COLLABORATED MELO-DRAMA, IN FOUR ACTS.

CRUCIBLE!

Hester Keirton, the woman of love and faith..........Miss Minnie Doyle
(First appearance in New York.)
Clemency Newcombe, the lady of the kitchen cabinet..........Miss Annie Edmondson
Eve Pensleigh, the woman of mystery..........Miss Annie Wakeman
Susan Knoutley, the maid of clover and daisies..........Miss Constance Leigh
Peggy Taffey, the woman of tears and fears..........Miss Ivy E. Rodamma
Stevey Newcombe, the boy of poetic pantomime..........Marie Louise
(First appearance in New York.)
Silas Craft, the man of usury and law..........John Dillon
(First appearance in New York.)
Lt. Frank Rodney, R. N., the man of love and war..........Cyril Searle
(First appearance in New York.)
Reuben Pengleigh, the man of avarice..........T. J. Hind
Trotty Newcombe, the man of watchfulness..........J. C. Padgett
Timothy Taffey, the commatherin confectioner..........M. C. Daly
(First appearance in 6 years.)
John Linkford, the man of duty and heart..........W. J. Ferguson
Count Fabrega, Juror Fogle, Phil, the Scrivener, } the man of aliases and disguises, {..........Vining Bowers
(First appearance in New York in two years.)
Knoutley, the man for fees and keys..........W. Scallon
Thomas Ricketts, the convict who repented..........C. T. Parsloe
(First appearance in New York in three years.)

THE DISAGREEING TWELVE.

Mr. Foreman Taffey.

Blinksop, the juror for gambling..........W. Scallon
Kickshaw, the spirited juror..........Frank Langley
Carpenter, the juror who loved air..........J. C. Franklin
Cross, the juror who liked suffocation, ...W. A. Rouse
Mildmay, the juror with a baby..........C. Clarence
Muggins, the skeptical juror..........G. W. Murray
Pemmican, the juror for Scotch Bannocks..........J. W. Brutone
Smithers, the juror for Matilda Jane, ...C. Roscoe
Snagley, the jolly juror from Yorkshire..........C. Parsloe
Templeton, the juror for conscience, ...H. B. Cutler

Fogle, the Talesman.

Adolphus, Q. C. the man for oratory..........Harry Gwynette
De Gex, the barrister up to snuff..........J. C. Parker
Austin, the clerk of wrong balances..........G. B. Holmes
(First appearance in New York.)
The Q. C.'s clerk, the man for precedence..........W. Peters
The Barrister's clerk, a man of consequence..........M. Wilton
His Lordship's Tipstaff, a man of language..........J. A. Wilks
The Court Tipstaff, a man of honor..........Charles Montrose
Wilmot Keirton, the man of metal..........Oakey Hall
Judges, clerks, ushers, guards and convicts, etc., etc., etc.

ACT 1st.—INGREDIENTS.

PENSLEIGH'S OFFICE.—(GEORGE HEINEMANN.)
"I do not fear the Crucible."

ACT 2d.—FUSING.

KEIRTON'S VILLA ON THE THAMES.—(MATT MORGAN.)
"I am yours in adversity as well as prosperity."

ACT 3d.—WHITEHEAT.

SCENE FIRST.—CORRIDOR IN THE OLD BAILEY—(GEORGE HEINEMANN.) PREPARATIONS FOR THE TRIAL.
SCENE SECOND.—TABLEAU OF THE COURTROOM IN THE OLD BAILEY—(MATT MORGAN.) THE TRIAL IN PROGRESS.
SCENE THIRD.—CORRIDOR IN THE OLD BAILEY. THE TRIAL ENDING.
SCENE FOURTH.—THE JURY ROOM IN THE OLD BAILEY—(GEORGE HEINEMANN.) THE TWELVE IN DISAGREEING COUNCIL.

ACT 4th.—METAL.

THE PRISON—(CHARLES HENRY.)
"Only when the Crucible Breaks does the Pure Metal Flow."

*** Incidental Music arranged by Mr. WANNEMACHER..........leader of Orchestra

1. Overture, "A Night in Granada,"..Kreutzer
2. Fantasie, "Alexis,"..........Hartmann
3. Galop, "Kleine Gonick,"..........E. Strauss
Cornet Solo..........J. Hammond
4. Waltz, "Cagliostra,"..........Strauss

At the close of the Performance each evening the new exit into 22d Street, on the right side of the Orchestra, will be opened. There is accommodation in 22nd Street for Carriages. Ladies' toilet on the second floor.

SEATS SECURED FOUR WEEKS IN ADVANCE.

Reserved Seats, $1.50; Admission, $1; Balcony, 50 c.; Lower Dble. Boxes, $15; others, $10

The above is reproduced from a play bill sent us by Mr. Sam. Mayer, the Chicago representative of the Dixon Company. It shows that the "Crucible" has had a place even in the drama.

The play was written by Oakey Hall, Mayor of New York, during the Tweed régime. He was also co-manager of the theatre and took a small part in the play. His is the last name on the programme.

Several prominent people were in this play. John Dillon was a well-known comedian; W. J. Ferguson was also in the cast of *Our American Cousin*, the night Lincoln was shot by Wilkes Booth. He is still on the stage. Vining Bowers is an actor of the old school. C. T. Parsloe was the original chinaman of Bert Hart's Danites.

We may add that the information concerning these people has also been furnished us by Mr. Mayer, who has a wonderful and very interesting collection of oldtime play bills, photographs of actors, actresses, etc.

Mr. Mayer has, in his delightful home in Chicago, over 1500 beautifully framed photographs. These photographs are part of the home decorations.

At some future time, Mr. Mayer is going to write something on this subject that will be quite interesting.

PROTECTS ELEVATOR CABLES.

Elevator cables are subject to both external and internal wear, the latter due to the rubbing of the wires and strands one upon another, the former to chafing and wedging in the grooves of the pulleys. In order to prevent rapid deterioration of cables they must be kept well lubricated. The lubricant should not only coat the cable as a whole but every strand and internal wire and prevent any rubbing contact of the inner parts.

It is altogether impractical to treat the cables foot by foot with lubricant, and those whose work it is to care for the elevators cannot be expected to give the same attention to this important detail if they are put to great trouble or danger in applying rope dressing. The rapid wear and frequent renewal of worn elevator cables is a familiar proof of the foregoing statements.

Dixon's "Handy Graphite Rope Dressing" was designed to embody the ideal qualities of Dixon's Flake Graphite as a wire rope lubricant in such form as would make it acceptable to practical men and assure its application.

This dressing is applied by holding the open edge of the package against the cable while in motion. There is no danger, no trouble, no waste, no dripping, and the lubricant is evenly distributed.

It is well recognized that Dixon's Flake Graphite prevents wear of all parts coated with it, and the economy of Dixon's "Handy Graphite Rope Dressing" in prolonging the life of wire rope and in saving the expense of frequent renewals should commend it to the careful attention of every firm operating hoists or elevators.

DIXON'S GRAPHITE BRUSHES.

Some Results That Are Surprising to Those Not Familiar With the Dixon Graphite Brush, But Not So Surprising to Those Who Are Familiar With Their Many and Exceptional Qualities.

The Dixon Company thought it had irons enough in the fire without going into the manufacture of graphite brushes, although the Company aims to manufacture about everything that can be made of graphite. Pressure, however, was brought to bear to have the Dixon Company manufacture graphite brushes as well as graphite resistance rods, which it was very successfully manufacturing for electricians. The result is that to-day the Dixon Company has a well-established graphite brush business, and has been obliged to make several additions to that part of its plant.

The following letter simply voices the sentiments of users of Dixon's Graphite Brushes for generators and motors. It comes to us from a western electric company, whose name we shall be very glad to give to those interested, but which we would not care to publish without permission, for which we have not asked.

"We merely want to emphasize the fact that Dixon's Graphite Brushes are worth their weight in silver, when it comes to saving commutators.

"We tried a set on an exciter where the commutator was about worn out, and we figured that it would require a new one in a short time. This was six months ago and we have not touched the commutator with sand paper nor done any turning down since using Dixon's Graphite Brushes. From all appearances, the commutator will be good for several years' service."

The Dixon Company has for a long time manufactured a graphite preparation for lubricating commutators and for keeping them in perfect condition. The following letter covers that article:

"The sample stick sent me in May has done wonderful work on my commutator, where all other preparations failed dismally. The dynamo does its work easier and does not spark.

"Kindly fill the enclosed order at your earliest convenience, so that I may not be without it."

THE SMALL BOY OF THE RIGHT STUFF.

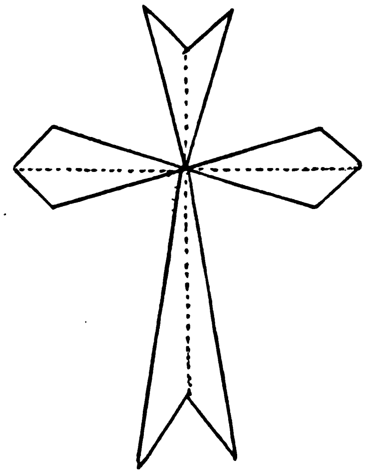
God Bless Him! He May Get in Our Way—But What Would Become of the Country Without Him.

Last month Jersey City had a large and destructive fire on the river front. The report in the New York *Herald* contained the following:

"Owing to the difficulty of establishing fire lines in certain quarters the fire was a paradise for the small boy, who abounded in astonishing numbers. He fell overboard, got in the firemen's way, ran across burning flooring with bare feet and did everything to drive the police frantic before he was finally subdued. He took chances where his elders wouldn't, for on the burning docks were about a score of gasolene tanks. These seemed to be his favorite resorts."

HERE IS A NEW OPTICAL ILLUSION.

Mr. P. J. Glauz, an engineer of the United States Lighthouse Department, stationed on the Pacific coast, has discovered a new and interesting optical illusion. It take the form of a cross.



You would think to look at it that it was longer than it was broad. As a matter of fact the horizontal measurement along the dotted line is about one-sixth longer than the vertical dotted line.

GRAPHITE FOR DRAWING DIES.

The following was printed in September "GRAPHITE" and omission was made by us to give credit to *Machinery*, from whence the article had been taken:

"The following mixture has given very good results as a lubricant on drawing dies when drawing sheet metal:

"Boil together until thoroughly mixed, 1 pound of white lead, 1 quart of fish oil, 1 pint of water, and three ounces of graphite. Apply to the sheet metal with a brush before it enters the dies.

"JOS. M. STABEL, Rochester, N. Y."

It may be of further interest to say that the Dixon Company has furnished graphite to several concerns for use in drawing dies and so far as we have been able to learn, have been loath to tell the manner of its use, apparently desiring to keep their little secret to themselves and for their own good, and for this we could not blame them.

This disposition to profit by what one has dicovered, is perfectly natural, and we are reminded of an instance of some years ago, where a manufacturer of engines instructed his erecting engineer to use Dixon's Flake Graphite in the engine cylinders of the new engines, to coat the walls of the cylinder thoroughly, but to bring away with him any of the graphite that might be left over, and not to tell the operating engineer just what had been done.

The result was that the engines of that manufacturer were known to run with remarkable smoothness when first started, and to run smoother and smoother, as time went on.

Graphite

VOL. VII. NOVEMBER, 1905. No. 11.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

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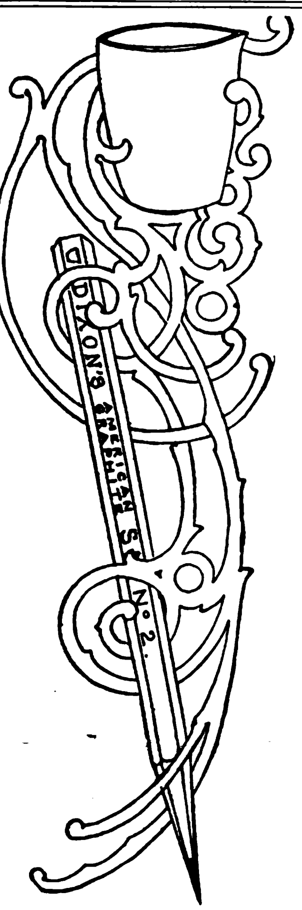


GRAPHITE LUBRICANTS.

For Farm Machinery and Agricultural Implements.

Farmers who have made themselves familiar with Dixon's Graphite Lubricants, and have used them on farm machinery and agricultural implements, such as engines, reapers, etc., have demonstrated to their own entire satisfaction that Dixon's Graphite Lubricants are a saving in machinery, in labor and in money.

Better lubrication is secured, and there is a very positive protection from rust in bearings and important parts from the machines and implements.

The following is a fair sample of letters received, and which shows how much good can be obtained from very small investments.

"Yours of the 16th at hand with samples. I must tell you that the samples you have sent me worked like magic. It came in the evening and I used it in the morning, and I believe that I can now run my machine a half day without stopping. Before I had the graphite I often had to shut down every fifteen minutes on account of hot bearings.

"Enclosed please find 35 cents for which please send me a pound can of your No. 2 Graphite. If I understand your price list it will be 20 cents and the 15 cents is for postage on the samples you previously sent. Let me thank you for sending these as they worked wonders for me.

"I have no need for a large quantity, but never again will I be without a supply of your flake graphite."

KEEPING EVERLASTINGLY AT IT.

It is the salesman's business to sell goods and the manufacturer's business to make them. But it is the business of both to "keep step" with one another. The salesman should never exaggerate the merits or quality of his goods nor should the manufacturer try to save any of the salesman's salary by trying to substitute a low grade lot of material when he expects the salesman to sell it as high grade product.

The manufacturer should never lose sight of the fact that no matter what the article is that he is manufacturing it cannot sell itself. And again, it makes no difference how old and well established the business is, it requires constant care to keep the customer pleased, and everlasting hard work on the part of the salesman to keep the customer filled with "desire" for the goods. There are always others in the same line, and unless the merits of your goods are kept up to the standard, and the salesman keeps continually after the trade it will only be a short time until you find that what you thought was a "cinch" was merely the customer's willingness to buy from you so long as you kept him satisfied. It is his money that pays for the goods, and whenever he is allowed to get the least bit out of line by either the salesman or the manufacturer, there is always another hustling salesman with up-to-date manufacturer ready to get his good American dollars.

—*Salesmanship.*

YOUR RIGHTS VS. YOUR DUTY.

I would not say there is too much talk these days of one's rights, but it is disproportionate and a little squint at one's duties ought to be sandwiched in now and then. This incessant blather about one's rights after awhile gets tiresome, and a change of tune would sweeten the music.

Doubtless we have our rights and we never should forget them, but we also have our duties. For instance, instead of eternally claiming the pay is too small and the hours too long, how about doing one's work better every day?

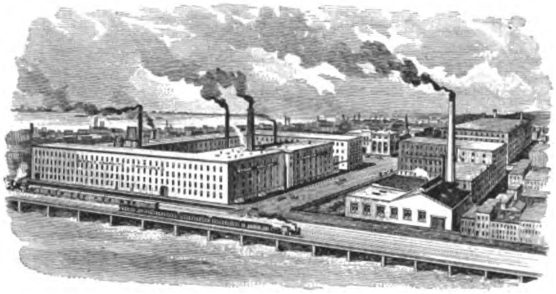
About everything we do can be done better. You can clear up your desk quicker, you can compose a more effective business letter, you can conduct a better interview, you can trim up your machine to better efficacy, you can fire your boilers more economically, you can reduce the time and cost of your job,—why not do this a little more? Not to stop on the question of your rights, but add this duty problem to the programme.

If all hands would face this way a trifle more and get all of one's jobs better done, more quickly done, with less waste, less expense; get all the dunnage out, get things done so one could look at the work and say, that "hits the bull's eye", maybe the rights question would right itself and all hands be better prospered.—JOHN A. WALKER.

If we talk too fine, the world will think it "Greek." If too loud, it will cotton its ears, and hear not. If too long, 'twill go to sleep before we finish. If too short, 'twill be just awakened when we're done, and wonder what aroused it.

—*Agricultural Advertising.*

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
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GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

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DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., November, 1905.

"FOR AN EASY CONSCIENCE, USE FLAKE GRAPHITE."

An Oil Agent Booms His Oil, But is Detected Using Dixon's Flake Graphite.

An interesting letter from "An old-timer on the Santa Fé."

"I find your special lubrication number of GRAPHITE interesting to locomotive engineers. Your story "The Practical Engineer" is certainly to the point, as most of us engineers can truthfully attest. "The Veteran Engineer" likewise knew well what he was writing about.

"Reading that copy of GRAPHITE recalled to my mind an amusing incident some years back when the festive agent of a lubricating oil company was in evidence at our division point for the purpose of booming his oil, by making a few records. He looked the field over carefully and cast his lot with one of our engineers, a very good fellow, by the way, sneaked a can of Dixon's Flake Graphite into the cab, used it through the auxiliaries, cut down the feed of the lubricators and naturally was able to make an astonishingly fine record. This happened, as I said, back in the old days when we used to pour melted tallow into the steam chests by the bucketful.

"Well, to continue my story, after the oil man and the engineer had got the mileage pint of valve oil (and Dixon's Graphite) down to the company's satisfaction, all engineers who did not equal this standard were called into the office to explain. You can imagine that this caused all kinds of trouble and dissatisfaction among the engineers; one in particular was boiling mad and, tho' he shut up as tight as the proverbial clam did, observed to his trusty fireman, "I'll show those 'pun'kin rollers' how to run an engine without a darn bit of valve oil." Then they filled the lubricator just so it would look all right and closed it up tight, mixed up Dixon's Flake Graphite and signal oil and fed that into the cylinders through the auxiliary oilers.

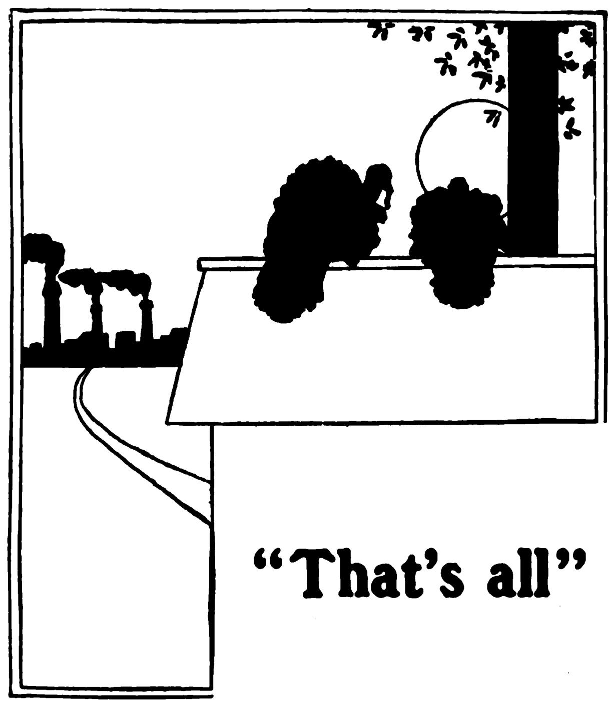
"In thirty days the first oil record was posted; this engineer had drawn no valve oil. Everybody thought the storekeeper had made a mistake, but thirty days later oil record No. 2 came along and still no valve oil for this engineer. Then the office took a hand in the proceedings and called our engineer to account for the matter and explain where he'd been getting his valve oil. He calmly announced that he'd not been using any valve oil, and an immediate order was given to hold his engine in and inspect the valves and cylinders, and a gentle hint dropped that he would get his walking papers immediately the report of the extent of the damage to his engine came in from the roundhouse. You know of course that the engine wasn't damaged; in fact the valves and cylinders were in the finest kind of condition when the covers were taken off and nothing more was said about discharge.

"What the office said or did with the oil man none of us ever knew but this foxy lad didn't show himself around our place again and nothing more was done about his oil record.

"If there's any moral in this reminiscence it is: "For an easy conscience, use flake graphite."

"Faithfully yours,

"AN OLD-TIMER ON THE SANTA FE."



Gear wear disappears in the presence of Dixon's pure flake graphite. Its disappearance is due to the coating of gear-teeth with a dense, uncrushable layer of graphite which prevents metallic contact and provides anti-friction surfaces.

We manufacture different graphite greases for many different gear needs.

STEAM AND RETURN PIPES FOR HEATING SYSTEMS.

BY W. H. WAKEMAN.

CHAPTER 1.

Some time ago there appeared in one of our mechanical papers a paragraph in which it was stated that if steam at high pressure is taken from a boiler and delivered to a heating system without reduction of pressure, it is not practical to return the water of condensation, unless a pump or some other device is used to force it against the pressure.

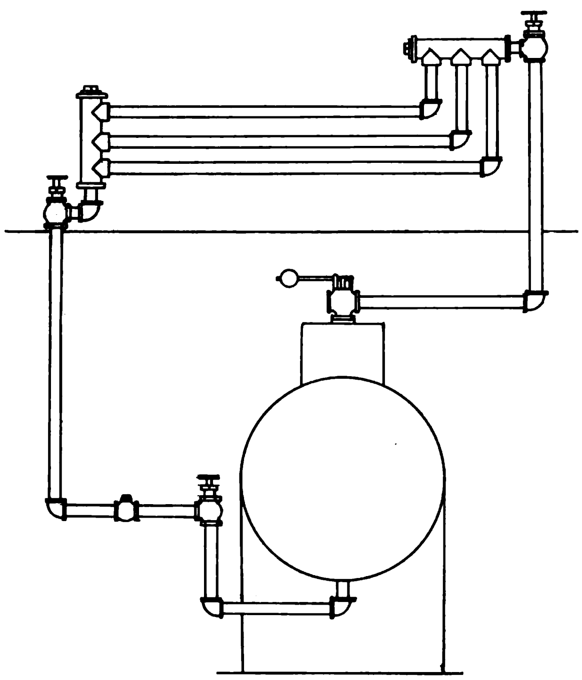


FIG. 1.

It is possible that the editor had what appeared to be a good reason for making the statement, but it is too broad to be strictly true, therefore a discussion of the subject will prove interesting and instructive. Under some conditions water will not return from such a system and enter the boiler without trouble, and this fact was undoubtedly the basis for the above mentioned statement, but Fig. 1 illustrates an arrangement of pipes that will give good results. Steam at high pressure is delivered directly to heating coils located above the boiler and the returning condensed steam enters through a pipe that is entirely independent of all other connections. This is a safe plan because there is nothing to hinder its continuous operation, assuming that the main steam pipe is large enough to maintain full boiler pressure. A swing check valve should be located in the return pipe near the boiler to prevent water from being forced backward through this pipe.

Fig. 2 illustrates a different arrangement of piping, although it comes under the same general head as the preceding illustration. Steam is taken from the dome and delivered to heating pipes the same as before, and the return pipe is arranged in the same way, but steam is taken from the boiler through another pipe to run an engine, consequently a pump or an injector must be used to put in water enough to supply the necessary steam which does not come back in the form of hot water.

The upper return pipe is "From radiator" while the lower one is "From pump." They are joined together by means of a tee as shown, and if the pipe between this point and the interior of boiler is of ample size, the arrangement will work

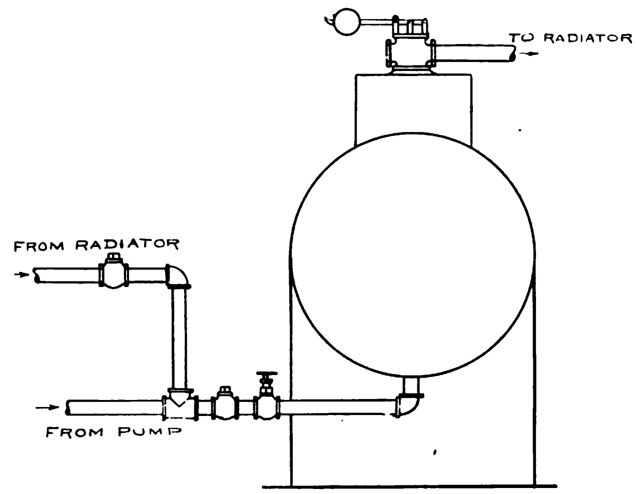


FIG. 2

well, but if not, the pump will create excessive pressure in the return pipe "From radiator," thus keeping this check valve closed and preventing hot water from the heating system from flowing freely into the boiler.

It will be noted that water from the pump is forced through one check valve, while that coming from the heating system must go through two of them, although there is no pump on this line to make the action positive.

A better arrangement is shown in Fig. 3, as the check valve in the pump line is on the outer side of the tee, thus making less friction for the returning water to overcome. The outlet of this tee is one size larger than the inlet, therefore friction from this point is reduced, consequently the upper check valve is left free to act.

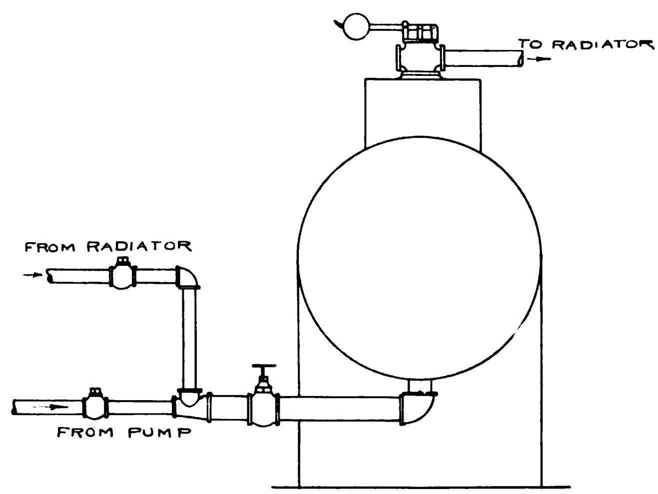


FIG 3.

All three of these arrangements come under the same general head, yet trouble may be found with Fig. 2 in practice, causing the engineer to claim that theory and practice in such matters do not agree, which is not a correct conclusion.

Fig. 4 shows another arrangement for returning water of condensation to a boiler. A duplex pump discharges cold water through a check valve, a gate valve and a tee into a vertical pipe which goes through the floor into a horizontal

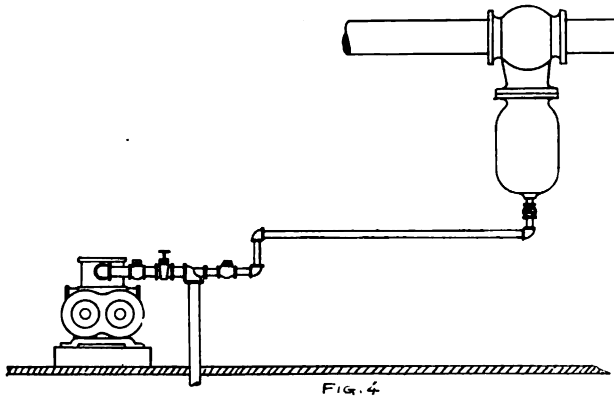


FIG. 4

pipe and thence through a heater into the boiler. A separator is located in the main steam pipe and as hot water thus removed is pure it is delivered to the feed pipe through a reducing tee as shown. In the plant from which this illustration was taken, it worked well, therefore no objection can be made to it, so far as that place is concerned, but it is not recommended for general use, for if steam is used rapidly, making it necessary to run the pump at a high speed, the check valve in the separator pipe will be closed by excessive friction, causing water to collect above it. This may cause the separator to be flooded by lack of proper drainage, throwing water over into the engine cylinder and causing a wreck. This arrangement of piping and valves proves economical in the use of water, as none escapes, but is dangerous for the above mentioned reason.

As separators are usually fitted with a water glass it is possible to tell when water is collecting in one of them, but when steam circulates freely through a water glass under such conditions, it soon becomes coated with foreign matter that prevents a clear vision of what is transpiring inside of it. Of course we know that such glasses should always be kept clean, but we are dealing with conditions as they are found, and not as they might be. Furthermore, a separator may run for years without trouble of this kind, after which it may quickly fill with water when the engineer is giving his attention to other matters. It would be very unreasonable to blame him for any resulting trouble under such conditions.

Fig. 5 illustrates the piping at the rear end of a tubular boiler that includes some interesting points. A small square within two circles represents a plug in the outer end of a tee in the blow-off pipe. This can be taken out when the boiler is empty, thus giving the engineer a good chance to clean out this pipe, provided mud or scale has collected in it. The threads of this plug should always be covered with Dixon's Graphite Pipe Joint Compound, to prevent it from "sticking" when an effort is made to remove it at some future time.

I recommend this article because I have tried it and found it valuable. Two days ago I removed these plugs from three boilers, taking them out easily, although both plug and tee are made of cast-iron. Graphite prevented the two metals from rusting together, although the hot water passing through the tee from the main steam pipe is almost as bad as steam for cementing two fittings together. By putting it on the plug all surplus is removed as it is screwed in, thus avoiding pushing a mass of graphite inside of the pipe where it is not wanted.

Again referring to Fig. 5 it will be noted that there is a cross connected to the tee by a nipple, followed by another nipple and a blow-off valve. The left hand pipe entering this cross is a cold water connection by means of which the boiler can be filled after it has been cleaned and inspected. This is supplied with water directly from the main supply pipe, therefore the boiler can be filled quickly, as there is much less friction to overcome than where it must run through the cylinder and ports of a pump, according to common practice in many cases. A short distance from where I am writing, the water piping of a plant was so badly arranged that it required about three hours to fill a 50 horse power boiler.

The right hand pipe discharging into this cross is a return from the main steam pipe. It is fitted with a globe valve on a level with a gate valve in the opposite pipe, thus presenting a neat and symmetrical appearance. If this is not considered important, an angle valve may be located in place of the ell above it, with stem in a horizontal position, as it will then

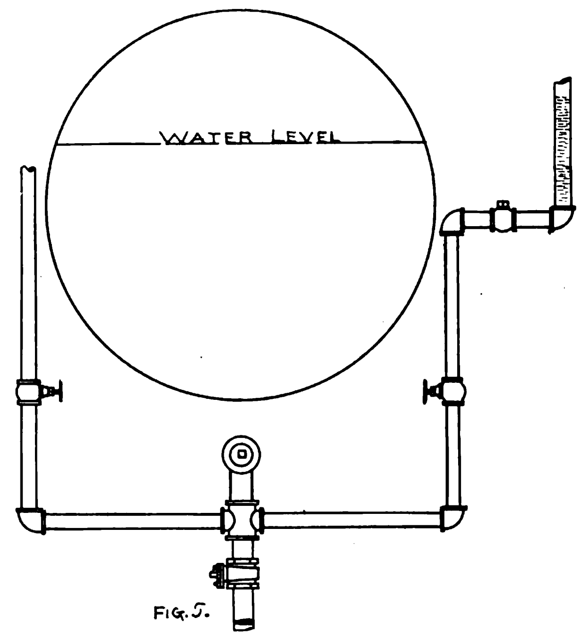


FIG. 5.

close against the pressure, making it possible to pack the stuffing box when this boiler is laid off, while others in the same battery are in use. It is not proper to locate an angle valve with its stem in a horizontal position in place of the ell shown below this globe valve, for then it could only be packed when pressure is removed from all other boilers in the battery, or at least it would be necessary to shut them off from the main steam pipe.

While this boiler is in use, water stands in the drip pipe as high as the "water level" of the boiler if there is no circulation through the pipes, but when condensed steam is descending from the main pipe above, there must be enough in the drip pipe to open the check valve, as shown in the highest vertical pipe. This check valve is below the "water level," therefore it is covered at all times by water, making it less liable to leak than if located at a higher point.

This boiler is not fed through the blow-off pipe, therefore when the fire is forced there is danger of evaporating all water out of it, and burning it off. A sleeve consisting of a pipe one size larger was put over it before the connections were made, and this protects the main pipe where it is exposed to great heat. The vertical nipple that is screwed into the boiler, also the ell below it are covered with asbestos. This can be removed at any time for the purpose of inspecting the pipe.

The return pipe discharges through the blow-off pipe into the boiler, hence there is less liability of the latter being ruined by excessive heat. Another point worthy of careful consideration is that this arrangement does not call for close nipples which are always a source of weakness. The shortest one shown is 1¾ inches between valve and fitting, thus giving ample room to use a pipe wrench on it. All nipples and pipe between the check valve and the boiler should be of extra heavy quality.

(Concluded next month.)

A COURSE IN STEAM ENGINEERING.

The readers of GRAPHITE have, during the past year, been interested and instructed by the monthly articles which have appeared in its columns and which were prepared by Mr. W. H. Wakeman, Chief Engineer of the New Haven High School, of which the Boardman Manual Training is a department.

The Rutherford Institute Young Men's Christian Association, of New Haven, recognize the fact that better service is required of the engineer today than was expected of him a few years ago. Better plants are being installed; more appliances are being introduced; boilers are operated under higher steam pressure, while engines and other machines are run at a higher speed than ever before; all of this tends to make the duties of engineers more complicated, calling for trained and intelligent operators, and therefore Rutherford Institute will inaugurate a course of instruction in steam engineering and have been fortunate in securing Mr. Wakeman as instructor.

Mr. Wakeman is too well known to need any special introduction. He has been in the service of the New Haven High School for eleven years. He has been a member of the Association of Engineers since 1883 and has been their instructor for the last ten years.

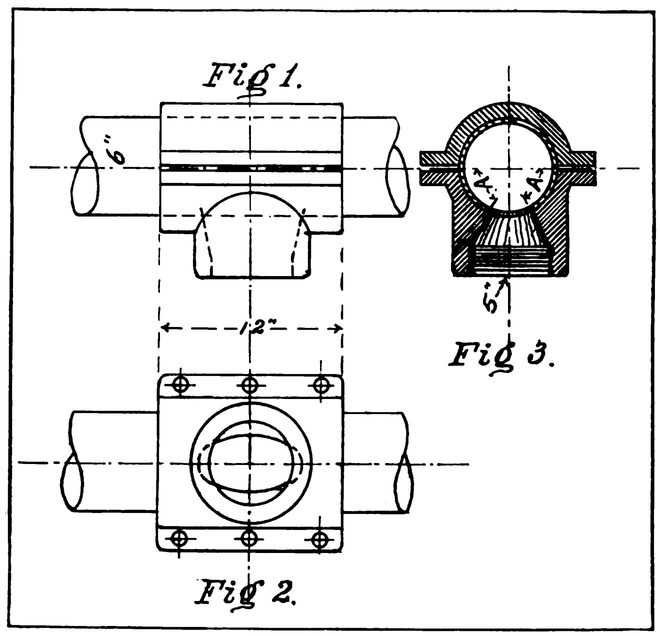
Mr. Wakeman has more than a local reputation. He is a much sought contributor to more than a dozen technical journals, and is the author of articles on steam and electrical engineering and of several books on the practice and theory of his profession.

AN EMERGENT STEAM PIPE CONNECTION.

By Lewis F. Lyne.

In the year 1884 the writer was in charge of a large electric light station, where the business was rapidly increasing, so that the least possible time was permitted for alterations or repairs. A new boiler of one hundred and fifty horse power had been added to the plant and was to be connected into a six inch main steam pipe. This main steam pipe was already attached to two boilers, and had fittings secured in such a way that it was out of the question to think of disturbing this pipe in making the necessary alterations, by cutting and inserting a tee to make the new connection.

The writer had a rough pattern made for a clamp connection shown in Fig. 1, and consisting of two parts held together by six ¾ inch bolts. This clamp was 12 inches long, and bored out to a neat fit upon the 6 inch steam pipe, the rough surface of this pipe having been previously smoothed off with a file. The outlet in the side of this clamp was threaded, to receive a 5 inch pipe—(see Fig. 3), and while this outlet was necessarily round, the opening through the inside of this clamp into the steam pipe was of an oval shape, 3 x 6½ inches, which would give an area of 19.5 square inches, while the area of a 5 inch pipe is 19.03. The object of making this oval was to secure so far as possible the widest bearing surface at *A*. This clamp when completed, was put in place upon the main steam pipe, after which the 5 inch pipe was cut, and connected by a stop valve with the boiler. Nothing now remained to be done but to cut the opening through the side of main steam pipe. Accordingly the 5 inch pipe was removed, leaving the clamp in position upon the main steam pipe, when with a scriber reaching in



through the 5 inch opening, the oval shaped figure was marked upon the side of main steam pipe. The clamp was then removed and the following day at the proper time (for we had about two hours to make this connection) with a "cape chisel" the writer cut out the oval section of the steam pipe. This part of the work only consumed about three quarters of an hour. The burrs were taken off with a file, and we were then ready to replace the clamp permanently. The writer has used mixtures of red and white lead, as well as other preparations, for making joints, but when all is said there is no substance for an emergency like this equal to Dixon's Pure Flake Graphite mixed with copal varnish to the consistency of paint; such a mixture was laid on in an even, thick coat with a paint brush both on the 6 inch pipe and on the inside surface of the clamp. When this was done the clamp was placed in position and tightened moderately by screwing up the nuts on the bolts. The 5 inch

pipe was then connected, using the same mixture upon the threads, after which the final adjustments were made by setting up on the nuts fairly tight.

This connection was made inside of the two hours and when steam was turned on shortly afterwards, the joint did not leak nor did it subsequently leak, being in daily use until the new station was built in another part of the city about five years afterwards.

The writer first used this kind of a joint upon the main steam pipe of the stationary engine in the Delaware, Lackawanna & Western Railroad shops in Hoboken, in the year 1873. It was employed in making a connection from the main steam pipe to the steam hammer in the blacksmith shop. These clamps are now regular stock goods upon the market but are not made exactly of the same proportions given here; but the mixture herein described will be found the best for the purpose of attaching these clamps, as it makes a permanent joint and preserves the exposed parts from corrosion and oxidation.

In connection with the subject of steam hammers, I desire to say that this very hammer referred to here had spring steel piston rings which were thick on one side and thin on the other, and commonly known as eccentrics, the thin side being where the rings were cut.

After these rings had been in use about six months, the ends became worn so that they would catch between the piston and cylinder and break off, sometimes cutting the cylinder. No oil lubricant was sufficiently durable to prevent this rapid wearing out of the rings. Futhermore, the ram was threaded upon the upper end, and the piston screwed upon it. One day this piston split in two, and almost wrecked the hammer. The writer had a new end forged upon the ram or piston, which was afterwards turned and grooved for the packing rings. Thus it will be seen that the ram and piston was one solid piece of metal. The gland was cut in two and after being placed upon the ram, a wrought iron ring was shrunk upon the outside, so that this gland was to all practical purposes solid. The junk ring in the bottom of the stuffing box was likewise cut in two and inserted, being held by two steel bolts through the walls of the stuffing box. The piston packing rings were made of spring steel of uniform thickness, 3/8 of an inch throughout, by 7/16 of an inch wide. These rings gave no trouble whatsoever and were in constant use for about fifteen months before they required renewal. This hammer was subjected to the most severe duty and was very much lighter than it ought to have been for the work it had to do.

Our success, however, was chiefly due to the application of a small oil pump to the steam pipe, and periodically giving the hammer an injection of Dixon's Pure Flake Graphite mixed with cylinder oil.

The throttle valve upon this hammer was a composition slide upon a composition seat (a bad combination at best), and used to cut badly when no graphite was used, but this cutting ceased, and in fact could not occur after graphite and oil mixed were introduced through the oil pump.

A DREAM OF ITALY.

My soul to-day
Is far away
Sailing the Vesuvian Bay;
My winged boat,
A bird afloat,
Swings round the purple peaks remote:

Round purple peaks
It sails, and seeks
Blue inlets and their crystal creeks,
Where high rocks throw,
Through deeps below,
A duplicated golden glow.

Far, vague and dim
The mountains swim;
While on Vesuvius's misty brim,
With outstretched hands
The gray smoke stands
O'erlooking the volcanic lands.

Here Ischia smiles
O'er liquid miles;
And yonder, bluest of the isles,
Calm Capri waits,
Her sapphire gates
Beguiling to her bright estates.

I heed not, if
My rippling skiff
Float swift or slow from cliff to cliff;
With dreamful eyes
My spirit lies
Under the walls of Paradise.

—THOMAS R. READ.

HEAVY GREASE WILL EXCLUDE DUST.

NEW YORK, August 9, 1905.

Speaking of the bad effects of dust on automobiles, you say that "no amount of casing will keep out the dust," and therein speak truly, but if the lubrication of bearings generally is by means of graphite mixed with a soft grease, or very heavy oil through small tubes by screw grease cups (not the automatic spring feed cup), the semi-solid lubricant will exclude the dust from the bearings. The writer has been using it on all bearings for 3500 miles of riding, and feels confident (from careful examination) that no dust has entered these bearings. It is the opinion of the writer that manufacturers generally should adopt such a system, securing thereby more perfect lubrication, greater cleanliness, less cost for lubricants in the operation of the car and no added cost for manufacture.

—GEO. HILL in *Cycle and Automobile Trade Review.*

HE IS GOING "TO TEACH" AND WILL "ORDER A HEAP."

"My friend i wish you to send me a few samples of your pencils an send me a book to order from i should like to order a heap from you i am going to teach school after Oct. 25 i can order a heap from you and sell for you yours very truly."

A TEXAS MISSIONARY.

He tells us what Dixon's Flake Graphite has done for him and what he has done for Dixon's Graphite. Both have done nobly—as we might expect.

If you are interested in lubrication don't fail to read this article.

A few months back we published a little story under the title of "A Friend in Need," of how an engineer of long experience with graphite as a cylinder lubricant helped out a comrade who was up to his eyes in trouble and perplexity over a cut cylinder at the busiest time when a shut-down and repairs would have been nothing short of disaster to the mill owners. Dixon's Graphite saved the day nobly.

We are lately in receipt of a letter from "the friend in need," Mr. A. H. Goff, engineer in charge of pumping station of the G. C. and Santa Fé R. R., Sanger, Texas, and it gives us great pleasure to reprint it not alone because of our appreciation of Mr. Goff's good will toward the Dixon Company, but because also his suggestions will prove interesting and valuable to others.

"I have your favor of the 10th inst., and also the ten copies of February GRAPHITE, which I have mostly distributed among those who are interested in graphite. Some are engineers, others business men who operate or control machines.

"I certainly have a fine opportunity for distributing graphite literature to the enginemen on the road, as the pump house door is but five feet from the track. I want to get them interested in graphite (tho' a good many know it already) so that, when they make requisition for oil and waste, a can of Dixon's Graphite will be included as a matter of course. During the past five years I've given a good many of them a few teaspoonfuls of flake graphite to mix with their valve oil to cool off a hot driving box, and Dixon's Graphite always did this as nothing else could.

"Sanger Water Station got a great name among the engineers and when they had a heating pin, eccentric or driving-box they'd say,—"If we can only get to the Sanger pump-house we'll be all right, for 'the old man' will give us some graphite and that will carry us home in fine shape." Now I had to buy all this graphite, even for my own use, out of my own pocket, for the company did not furnish it, and really I had to quit buying for I had so many calls for "a little of that Dixon's Graphite" that I simply couldn't afford to keep it on hand. Nowadays most of the boys buy their own supply.

"I have been running an air compressor for the last six years pumping water by the air-lift system and I have used Dixon's Flake Graphite in the air cylinder for the last five years. I wish you could have looked into the cylinder yesterday when I took the valves out to clean them. An expert machinist friend of mine happened to be passing at the time and I called him in to take a look at it. This is what he said: "That cylinder is in the finest condition of any I ever laid eyes on. It looks like the barrel of a $200.00 shot gun. How long have you been running it with graphite?" "Five years" said I.

"When I first began to use graphite in the cylinders there was a deep score along the bottom but this entirely disappeared long ago. It was about a year since I had some trouble with a knock in the air end and the general foreman brought a machinist up and took the head down and the piston out. The trouble was only with the loose rings, so we tightened up the follower and replaced the piston. As the foreman was replacing the air piston he observed: "A1, those rings and that piston are in fine shape for five years service; what have you been doing to them?" "Only dosing them once in a while with Dixon's Graphite and oil," said I. "Keep it up," said he; so I have.

I first commenced to use graphite in the air cylinders because the company did not then furnish any special oil for the air end. If I used any, it had to be common engine oil and poor stuff at that. One day when I started up with the gauge at only 120 lbs., a small explosion took place in the air cylinder. Just before that I'd been reading in "Compressed Air" of explosions in air cylinders from explosive mixtures of hot air and gas and I'll tell you I was badly frightened.

Air at 120 lbs. has a pretty high temperature, as you know, and it flashes this oil of low boiling point into an explosive gas and some terrific explosions in air compressors and air receivers have occured from just this cause.

The use of Dixon's Graphite is an effectual, safe and complete remedy. I use a swab saturated with valve oil and graphite and swab the air cylinder walls three times a week. Then I use, say, three drops of oil per minute through the regular lubricator on the air end, for ten minutes each hour. An air compressor cylinder does not require anything like the same amount of oil that a steam cylinder does.

I hope before long to be able to write for GRAPHITE, a little article on "What Dixon's Graphite has done for me."

(Signed) A. H. GOFF,
Sanger, Texas.

ROLLER COASTERS.

Take a strip of strong paper about four inches wide, and as long as you can get. Several pieces pasted end to end will do. Pass the paper over the smoking flame of a lamp, or, better yet, cover one side with electrotyping graphite. Place on end of the table several books of gradually decreasing size. Spread the strip of paper over these so that it assumes the form of a house roof, from the large book toward the small ones. At the end let the paper fall into a plate. At the other end, where the large book stands, pour water, drop by drop, on the paper. These drops will run down the inclined plane; then, in consequence of the momentum acquired, will jump over the back of the second book, and thus following one another they will reach the plate. The spectacle of these drops of water rising and falling by turns, and seeming to compete in liveliness with each other, is most curious.

—*Buffalo Express.*

TICONDEROGA.

The little hamlet of Ticonderoga, New York State, has two occasions for distinction, one being of war and the other of peace. A fort was built there in the 18th century and was later captured by General Ethan Allen, in behalf of the American army. The occasion of the capture was a thrilling episode in the war of the revolution long, long ago. The remains of the fort are still in sight, and this year 1905 between 18,000 and 20,000 tourists stopped there and paid the old fort grounds a visit. The United States Government should buy the site and keep the walls from further disintegration.

The other occasion of distinction is the Dixon Ticonderoga flake graphite mines. These have become even more celebrated than the old fort. Outside of these two things Ticonderoga would be in dense obscurity.

An American mining engineer recently made a report, saying among other things: "The Dixon mining plant at Ticonderoga is equipped with the most modern and improved machinery and apparatus for mining, concentrating and refining graphite." Another writer says: "The only deposit of graphite that has been worked systematically for a peorid of years, is the Dixon graphite plant at Ticonderoga." Another writes: "The Dixon plant at Ticonderoga has outclassed others and stands first, and produces flakes of such purity as to command the best prices."

There was a celebration one day in August 1905, at Ticonderoga on the fort grounds, at which Mr. George B. Bascom, a resident of Ticonderoga and a well-known member of the Dixon mining family, was the chief orator. His recapitulation of history, character delineations and his reminiscence of old times in Ticonderoga were pronounced fine by those who heard. Indeed, they had to be, for it is one of the Dixon maxims that its men must do well whatever they do or quit Bascom's speech was called AA1. Hurrah for Ticonderoga, renowned in history and by the Dixon graphite mines.—JOHN A. WALKER.

JAMES J. HILL'S OPINION.

The law of the universe is, "As ye sow, so shall ye reap." James J. Hill says, "too many young men of today either expect to reap with scanty sowing, or to reap as soon as they sow." The law, however, cannot be changed, it will remain, "As ye sow, so shall ye reap," and there will also be a suitable time between seed time and harvest, which will never be changed.—JOHN A. WALKER.

AN APT REPLY.

We sold a man in New York State in June a bill of goods, which, while long past the due date, is not paid yet as we write, in October. We finally wrote him and called his attention to it, and asked that he send check.

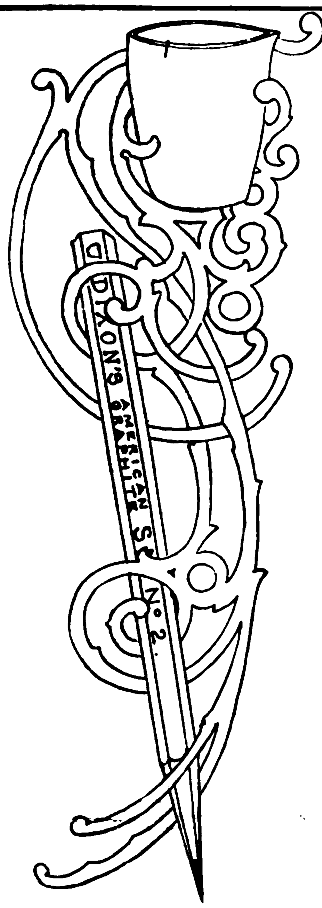
In reply he says: "What good would it do for me to send check, I have no money in the bank and do not know that a check would do you any good, unless I have some money in the bank."—JOHN A. WALKER.

IF you have a horse-drawn vehicle of any kind you need Dixon's Graphite Axle Grease. It is unequaled.

Graphite.

VOL. VII. DECEMBER, 1905. No. 12.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



A BAD AXLE AND A GOOD GREASE.

A New One for Dixon's Everlasting Axle Grease and a True Tale,--Strange As It May Seem.

Goods that are really meritorious, often produce unexpected results.

Users of Dixon's Everlasting Graphite Axle Grease long ago discovered that for cuts, sores and galled spots on horses, it was as good, if not better, than any ointment they could obtain, and now comes along a doctor and a liveryman who claim that it has most successfully cured a mechanical imperfection.

A well-known Brooklyn doctor changed to a third livery stable because, as he thought, his carriage axles were not properly looked after. The doctor told the liveryman that he invariably had a hot box on one of the hind wheels to his great annoyance and delay, and he wanted his carriage looked after as it should be or he would try and find someone who would.

The liveryman thought it better to carefully examine the wheels and spindles and did so, finding one of the spindles out of true. He informed the peppery and much annoyed doctor of the mechanical fault, but said he did not know that he would be able to do any better than his brother liverymen. His stable foreman called his attention to a box of Dixon's Graphite Axle Grease which had been left there that morning as a sample by someone of the Dixon missionaries.

As a forlorn hope, the Dixon Graphite Axle Grease was applied to the faulty spindle, as well as to the others.

The doctor started out for morning calls and after about three hours' run, returned with a smile on his face. The axles were examined and the faulty spindle received another dose for safety's sake. That afternoon the doctor started out at two o'clock and did not return until eleven, and the wheels were running smoothly and cool and the doctor was a happy man.

After five days' running and no trouble, and only one more application of graphite grease to the faulty spindle, the doctor declared that if he could find a remedy as much better than all other remedies, as Dixon's Graphite Axle Grease was better than all other axle greases, his fortune would be made.

As for the liveryman, he started for Jersey City, where he unfolded this tale and ordered for his stable a goodly supply of Dixon's Graphite Axle Grease.

RETOUCHING POINTS AND PENCILS.

A Professional Negative Retoucher Declares Dixon's "American Graphite" Points and Pencils are the Ideal Tools for All Retouching and All Retouchers.
More Work and Better Work Can Be Done with Dixon's Than With Any Other Make, and Done With More Ease and Greater Satisfaction.

A letter comes to us from a professional negative retoucher who writes us that after eighteen years experience in using goods of other makes, that Dixon's "American Graphite" points and pencils are the ideal tools for all retouching and all retouchers.

He supposed that Dixon's "American Graphite" pencils were simply for commercial and for school use, and so had not before used them in his professional work. After careful trial, this professional found that Dixon's "American Graphite" points and pencils are far superior to any other pencils or points on the market. He finds that he can do more work and better work with Dixon's than with any of the other makes and he can do it with more ease and greater satisfaction.

He finds that Dixon's pencils are suitable for either thin or dense negatives, for large or small heads, for light or heavy strokes or stipple, and have an actanic value co-equal with the negative color, producing a soft and delicate effect in the shadows, yet blending to the desired gradation from shadow to half-tone and from half-tone to high-light.

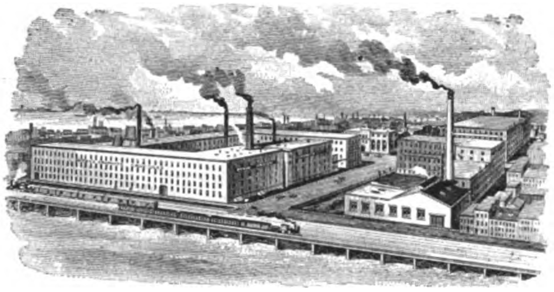
So pleased was this professional with the results, that he induced three out of the four galleries near him to try the Dixon pencils, with the result that they are enthusiastic converts. He is surprised that the Dixon Company has not made any special effort to bring this matter before the thousands of retouchers who are not using the Dixon pencils, for he believes that if a retoucher once tries Dixon's pencils he will easily learn why they are the best and will then become a convert, an enthusiast and a missionary for Dixon, as this professional already is.

Thomasville, Ga.

The pencil you sent me is a fine one. Hereafter I will use 'Eterno' only. Please accept my thanks.

J. D. HASHAGEN.

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

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JERSEY CITY, N. J., December, 1905.

NEW YEAR THOUGHTS.

Take down your Shakespeare and read his play, *The Tempest*, or better still, go somewhere and see it well played.

It was written a year or two before his death, and not merely in the maturity of his genius but in the very ripeness of his character, when the seriousness of human destiny was vividly present to his mind.

The pith of the play is that the discarded Duke Prospero has a mantle which, when he puts it on, equips him with more than human power, and he has an unseen associate, Ariel, who works charms at his behest. A critic says, "These dreams of Shakespeare are divine phantasms and shadows of things that really are."

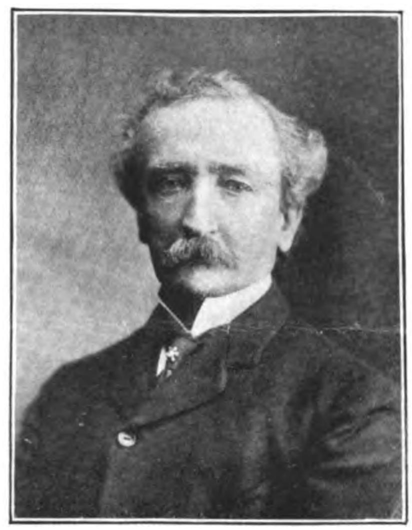
"We hardly," the critic adds, "tell our children a fable with no purport in it, yet we think God sends his best messengers to sing fairy tales to us fond and empty."

Perhaps no real supernatural power will add itself to our weakness, and perhaps we may have no unseen "tricksy sprite" to come to our beck and call; yet does not the important hidden power slumber within us all and wait our invitation to appear?

This, then, is the New Year lesson; we are all of us more than we have really shown, there slumber in us possibilities yet in quiesence, we have none of us yet stood on mental tiptoes, we have none of us estimated ourselves highly enough, the magic mantle we have not yet evoked, the airy spirit we have never yet besought with earnestness enough, our best selves are yet asleep; call then loudly to yourself in 1906—waken the slumbering possibilities, say unto your asleep self: Awake, arise! say as Prospero did, bring me my mantle, and as Prospero said to the airy spirit Ariel, "What, Ariel, my industrious servant Ariel." So shall, as in the play, the spirit within reply, "What would my potent master? here I am," and come forth as power—now sleeping—to nerve your arm; then with all your faculties, those already developed, and those still as possibilities, surprise you with their potency and you have the happiest of New Years.

"Weep," says Mohammed, when you read the Koran, "and if you cannot weep, feign weeping and in time you will weep." So call on your more important self, if it hears not, call louder, call at morning time, call at high noon, call when the stars appear, and the magic mantle will fit your shoulders, and the "tricksy" Ariel will work unseen for you.

—J. A. WALKER.



JOHN A. WALKER.

Elected First Vice-President of the National Association of Stationers and Manufacturers, at their big meeting at St. Louis, October 9 to 12, 1905.

DECEMBER.

With whisper and rustle and start and hush
The dry leaves murmur on tree and bush.
On sombre pines, with bows bent low,
Forsaken nests are piled with snow.
The chickadees, alert for seeds,
Chatter and cling to the swaying weeds.
The snow drifts deep in the country ways,
And short and cold are the cheerless days.
Yet, fair on the brow of the frozen night
The Christmas stars shine, large and bright.

—SARA ANDREW SHAFER, in *The Outlook*.

Coquille, Ore.

I find the 'Eterno' all that you claim for it. It carries a finer point and writes smoother than any pencil I have found.

Jessie C. Simmons.

STEAM AND RETURN PIPES FOR HEATING SYSTEMS.

By W. H. Wakeman.

Chapter 2.

Fig. 6 illustrates the steam supply and return pipes of a large radiator located in a public building, that were not satisfactory in practice. Steam entered at the right as indicated by the arrow *2* and passed upward at *3*. Water in this steam dropped into the loop shown, leaving dry steam for the radiator.

Hot water came down as shown by the arrow *4*, passed the check valve *5* and going as indicated by *6* and *7* found its way to the main return pipe which carried it back to the receiver. Attention is called to the fact that as hot water travels through *6* and *7* it is not forced through the loop *8*, but when this is filled whatever follows travels as if there was no loop in the system.

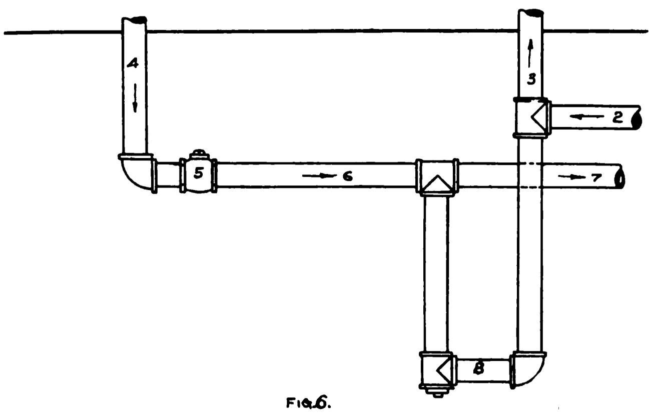


Fig. 6.

Furthermore, steam coming from other radiators created as much pressure at *7* as there was at *2*, consequently it travelled back through *6*, *5* and *4* to the radiator where it heated the air valve, causing it to close before all air was expelled, therefore it became air bound, which of course prevented it from heating as intended.

For the benefit of those readers who are not steam heating engineers I will say that an air valve that is properly adjusted on a radiator remains open for the passage of air but closes as soon as it is heated by steam. For this reason steam should enter one end of the radiator only.

As I have stated that steam passes backward through the check valve *5*, an explanation of it is required. Examination of the illustration shows that *5* is not covered by water, but must oppose the action of steam. It was not a steamtight valve, and as the pressure tending to hold it down was light at first and became nearly or quite balanced later on, there was nothing to hinder the passage of steam in the wrong direction. Very few check valves are tight under these conditions.

This piping was taken down and remodelled as shown in Fig. 7. Steam enters at *2* and passes up *3* to the radiator as before, and all water goes into the loop below. Condensed steam or hot water comes down *4*, passes *5*, *6* and *7*, going to the main return which carries it back to the receiver.

The check valve *5* is now in the lowest part of the loop *8*, where it is always covered by water, as all coming from the radiator must go through this loop. The presence of water here is sufficient to prevent steam from passing to the outlet of radiator, even if there was no check valve to oppose its progress, because the pressure is light, consequently cold air is forced out until steam from the inlet end of radiator reaches the air valve and closes it, leaving the apparatus in good order for quite efficient operation.

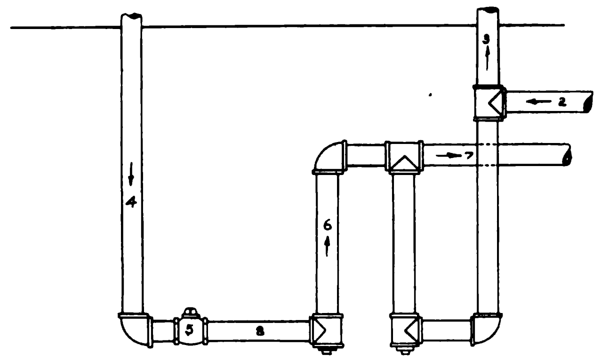


Fig. 7.

There are two loops in this illustration with a tee in the lower part of each, in which a plug looks downward. The threads on these are carefully covered with Dixon's Graphite Pipe Joint Compound before they are screwed into place, thus making it an easy matter to remove them and clean the loops. Much sediment will collect at these points, especially when a steam-heating system is new.

Fig. *8* illustrates vertical steam pipe or riser, out of which steam is taken to supply a five pipe coil in a room to be heated. It is controlled by an ingeniously contrived valve which not only admits steam to the coil, but also allows any water that may be mixed with it to go to the return through a small pipe provided for this purpose. This arrangement provides dry steam at the admission valve instead of a "slug" of water when an attempt is made to turn on steam.

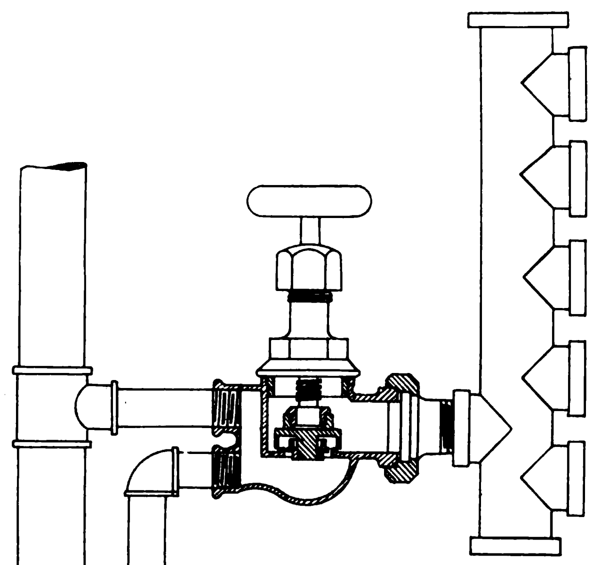


Fig. 8.

Inasmuch as steam can readily pass from the main to the return, it is only reasonable to ask how it is possible for the five pipes to be filled, as there appears to be no reason why steam should be forced to circulate. In some cases it has been necessary to restrict, or even entirely stop the flow of steam to the return pipe, as shown in this illustration, as otherwise it would not go where it was wanted. As a rule this is uneces-

sary because steam fills the whole system, equalizing the pressure so far as steam is concerned, but water is heavier, hence it seeks the lowest possible level which brings it to the automatic receiver from whence it goes back to the boilers.

Fig. 9 illustrates a different application of the same principle, as steam is taken from a horizontal pipe and water of condensation goes to a similar return pipe. In this case a cast iron radiator, a portion of which appears in the cut, is supplied with steam. A return may be provided at the other

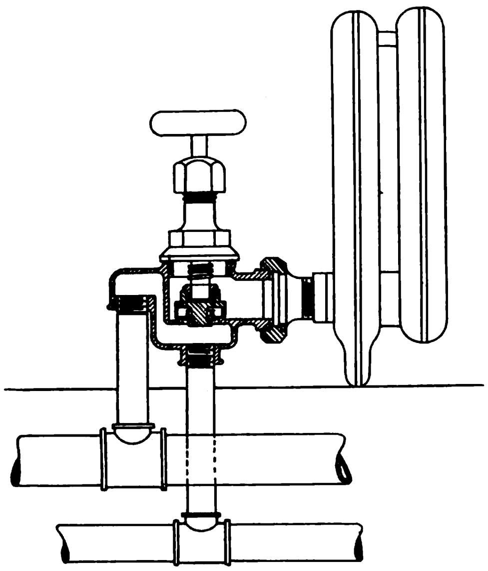


Fig. 9

end of it, to dispose of water resulting from condensation of steam, and this will be necessary if the radiator is exposed to a draft of cold air, but under favorable conditions only the return pipe shown in the illustration is required. So far as the radiator is concerned, this constitutes a "one pipe system," because steam enters and water leaves by the same connection, but when we consider the piping as shown, it becomes a "two pipe system" therefore taken as a whole it does not strictly belong to either of the above mentioned, but is in a separate class.

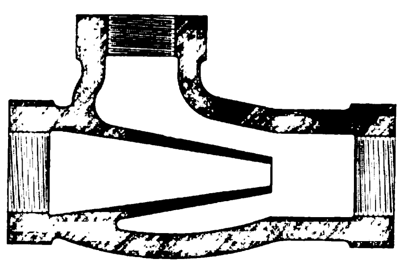


FIG. 10.

In case water fails to flow out of a coil of pipe or a pipe radiator readily, a suction tee may assist in the operation. This tee is illustrated in Fig. 10. The upper inlet is attached to the return pipe of the coil and a live steam connection made at the left. When steam is turned on at this point it acts as a siphon or an ejector drawing water out of the coil and discharging it into the main return pipe through the right hand connection. This is not recommended for general use, as it is better to design and erect all parts of a heating system so that they will work automatically, but occasionally there is a case where a certain portion will not give best results, and the cause is not plain, or else there may be some difficulty in re-arranging the pipes to conform with good practice. In such a case the suction tee will afford temporary relief until a more favorable time for making radical changes in the piping.

In some places where steam is used during the day and shut off at night, no provision is made for heating the large body of cold water that must be disposed of when the system is first started in the morning. The quantity of this water may be kept down by allowing the hot water pump to run after steam is shut off in the afternoon or evening, thus removing all water in the system while it is hot.

As soon as the steam supply is shut off, that remaining in the pipes begins to condense, forming a partial vacuum which prevents water from readily going to the receiver. To overcome this objection a check valve may be attached to the upper part of the system, so as to open inward, then as soon as pressure in the pipes is less than atmospheric pressure, air will rush in and break the vacuum. The valve should be as large as the pipe to which it is attached, provided very prompt action is desired, but otherwise a smaller one will answer the purpose.

Even after this precaution has been observed, there will be plenty of cool water in the morning, for after pipes have been standing empty all night they condense steam very fast during the first half hour they are used.

When such cool water goes to a receiver from which it is pumped into the boilers, it should be forced through a feed water heater, and provision made for turning in a generous quantity of live steam for a short time, thus heating it enough to prevent damage to the boilers by contraction of those parts which would otherwise be in contact with cool water. If the engineer cannot secure means for heating this water it is better to let it go to the sewer than to flood the boilers with it, although it is pure and will make no scale, therefore is more valuable than fresh water.

FEEDING DIXON'S FLAKE GRAPHITE TO AIR AND TO STEAM CYLINDERS.

SHERMAN, Texas.

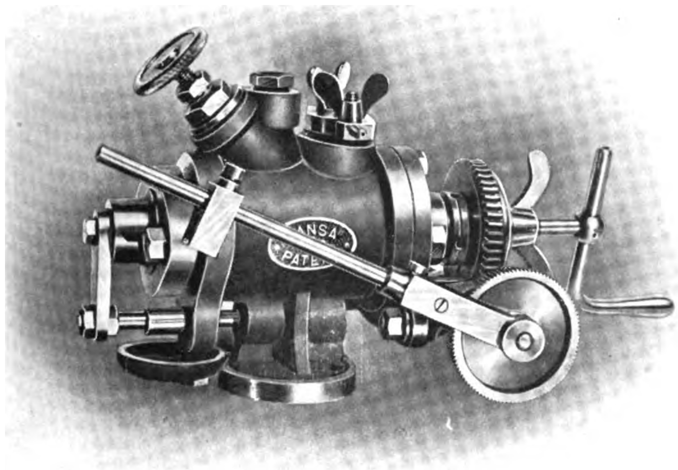
Your letter to hand. I have not as yet been able to get to the city to purchase me any graphite lubricators for the air cylinders, but I am feeding a small quantity of Dixon's Flake Graphite at intervals through indicator connections, but haven't had a chance to examine and find out results as yet. I feed graphite to steam cylinders regularly with a hand pump and have for quite a while, also on all bearings. I also get good results from Dixon's Graphite on the plungers of an outside packed high pressure pump of the Worthington type; it prolongs the life of the packing and keeps plungers from scoring and reduces the friction. This pump handles 1½ million gallons of cold water per twenty-four hours.

(Signed) GEO. STEPHINS, Engr.

San Luis Potosi, Mexico.

The 'Eterno' copying pencils which I received from you are most satisfactory. It is the only pencil in which I have found qualities which no other pencil—even those manufactured in Austria, possess; viz., writes black, point can be sharpened to a needle point, point does not break with hard pressure in shading, and produces perfect copies.

C. C. Viraniontes, M. E.



"HANSA" GRAPHITE LUBRICATOR.

A Foreign Invention Making Use only of Dixon's Ticonderoga American Flake Graphite.

The Hansa Lubricator has been adopted by the naval, the marine, the mercantile, and state railways; municipalities, electric works, mines, factories and other important foreign concerns, especially those in Germany, Austria and Hungary.

A page description of this lubricator was given in July GRAPHITE, 1903.

Since that time, improvements have been made in the lubricator and it has been well demonstrated that a real saving of 60% to 70% in oil consumption is effected by means of this lubricator, through the use of about 3% of Dixon's No. 2 Flake Graphite to the cylinder oil.

The addition of Dixon's Flake Graphite results in a high polish to all rubbing surfaces, as well as reducing friction to a minimum. The mechanical efficiency of the engine is improved; the life of the engine is lengthened, the piston slides and rods are rendered steam-tight; glands require packing less frequently, and the engine runs more quietly.

Graphite lubrication is especially desirable where superheated steam is used, as the graphite is indestructible and is not affected by the superheated steam which is a very important matter where high temperature steam is used.

The Hansa Lubricator delivers a perfect mixture of graphite and oil, automatically.

It is an excellent example of an automatic force-feed lubricator. It is strongly and compactly made to withstand rough usage. It is designed for feeding Dixon's Ticonderoga Flake Graphite No. 2; no other should be used.

Figure 1 is a general view of the lubricator and illustrates the compactness and strength of the device.

Figure 2 is a sectional elevation and clearly indicates the details of construction and method of operation.

The lubricator is securely bolted upon any convenient portion of the cylinder, as near to the steam pipe or valve as possible, and the delivery pipe *X* connected in the usual manner, either to the steam pipe or above the valve. The ratchet arm *H* is connected with any convenient, reciprocating part of the valve gear, and the motion converted into rotation through a pawl and ratchet worm and worm-wheel *C*.

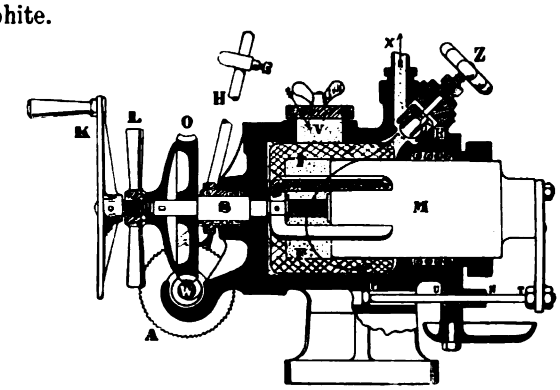
The worm-gear runs in a bath of lubricant, thus preventing all wear of parts.

By tightening the wing-nut *L*, the worm-wheel is connected with the spindle *S* and the blades *FF* of the agitator or paddle caused to rotate.

To fill reservoir, the wing-nut *L* is loosened, and this allows the spindle *S* to rotate, independent of the worm-wheel. The crank *K* is turned to the left until the plunger of the piston *M* comes out to the proper point, as indicated by the guide piston *P* coming into contact with the bushing used. The cap *V* is then removed and the reservoir filled with Dixon's No. 2 Flake Graphite and oil, 3% by weight of graphite being the quantity recommended for best general results.

The filler-cap is replaced, the wing-nut *L* tightened, and the spindle slowly revolved, screwing the plunger *M* into the reservoir, and thereby displacing the contents.

As the spindle or shaft *S* revolves, the blades *FF* of the agitator revolve, and prevent any settling of the particles of graphite.



The lubricant is forced in the direction indicated by the arrow, past the non-return valve *R*, through the delivery pipe *X*.

Regulation is effected by lengthening or shortening the stroke of the lever-arm *H* by means of the set-screw shown.

An interesting feature of this lubricator is that a small brass cup for measuring the exact amount of Dixon's No. 2 Graphite required for each reservoir of oil, is furnished with each machine.

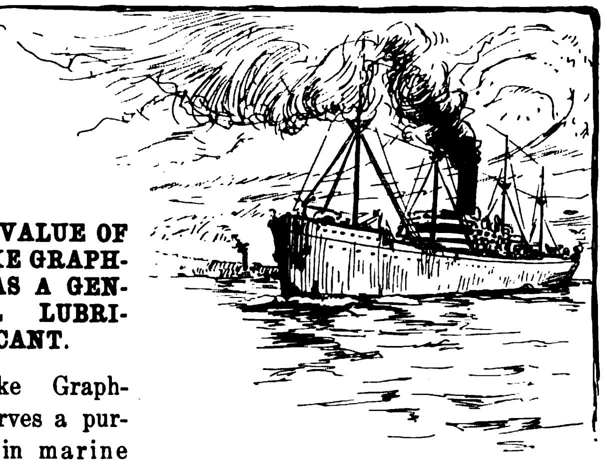
Seven different sizes are manufactured, of capacities from 3/16 of a pint up to 4-1/2 pints, designed for engines of 10 horse power up to 3,000 horse power.

The strong claims advanced by the makers of the Hansa Lubricator regarding the savings of cylinder oil effected, are strengthened by published tests made at the works of the Bruxer Coal Mining Company, where reductions from 40% as high as 84.5% in the cost of lubrication, were attained under service conditions.

The Hansa Lubricator is manufactured in Germany, where it has come to be extensively used in large power plants and has given excellent results.

Mr. Gustav Halberstadt of Copenhagen, Denmark, has obtained the agency for the lubricator in all countries, except Germany, Austria and part of Africa, and reports excellent returns from his active work of introduction. Mr. Halberstadt

is the Danish agent of the Joseph Dixon Crucible Company, and is untiring in his efforts to educate his part of the world to advantages of graphite lubrication and the merits of Dixon's Ticonderoga American Flake Graphite.



THE VALUE OF FLAKE GRAPHITE AS A GENERAL LUBRICANT.

Flake Graphite serves a purpose in marine engine lubrication that is peculiar to itself, and its use brings enormous advantages which cannot possibly be secured by the use of oils and greases alone, nor by any other lubricant known either to theory or practice.

Flake Graphite cools off hot bearings and keeps them running continuously cool when oils and greases alone fail utterly to reduce the excessive friction.

If Flake Graphite is used regularly in the lubrication of main and connecting rod bearings, thrust and tunnel-shaft bearings, there is a decided reduction in friction and a positive end of friction troubles.

It is a physical impossibility for bearing surfaces to "cut" or seize in the presence of even a minutely thin layer of flake graphite.

If used for swabbing rods and valve stems, Flake Graphite saves packing, prevents leakage, while reducing friction, and keeps rods beautifully smooth and polished, clean and true.

There are unlimited good uses for Dixon's Flake Graphite on the auxiliaries, and no marine engineer whose experience has revealed to him the possibilities of Dixon's Flake Graphite for general lubrication will willingly be without it, even if he has to buy it himself.

Stationary and locomotive engineers without number have bought Flake Graphite out of their own wages rather than be without this most valuable supply. This clearly shows its practical value even if there were no other evidence. There is only *one* Flake Graphite—DIXON'S.

Samples of Dixon's Pure Flake Graphite and valuable literature will be sent free to any engineer requesting them.

HE KNEW IT.

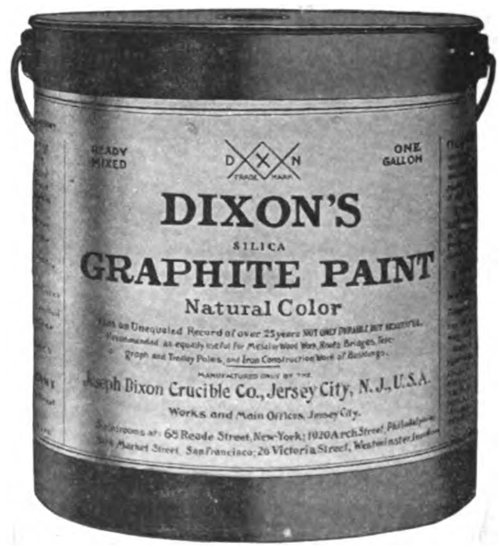
A good story is told us of a college professor's experience with an inventor of the "unlettered-genius" type, who came to the professor with a model of a perpetual-motion machine.

"It looks plausible," said the professor, "but it won't work. What are you going to do about gravity?"

"Gravity!" yelled the inventor in derision, "t'll with gravity, we'll use plenty of Dixon's Graphite Grease."

BATTERY WRINKLE.

I find that I can greatly increase the ampèrage of a dry cell and prolong its life by boring down on each side of the carbon post with a three-eighth inch drill as far as it will go, and then putting in each hole a saturated solution of sal ammoniac. Allow it to soak in thoroughly, then make a paste of dry, flaked graphite, with some more of the same solution, and tap the holes full of this paste with a lead pencil. After letting it stand for a while, tap in some more, then put some dry graphite on top, and take the sealing compound that was drilled out from the top of the hole, place it there again, apply to it a hot soldering iron and melt it, when the cell has again the appearance of a new one —*Horseless Age.*



DEALERS IN PAINTS.

Dixon's Silica-Graphite Paints are excellent sellers. No well equipped dealer in paints should be without them.

Dixon's Silica-Graphite Paints sell well, look well and wear well. They are truly ornamental as well as thoroughly protective and durable.

They are recommended for iron fences and railings, roofs, bridges, smoke-stacks, boiler fronts, areaways and structural and ornamental work of all kinds.

We supply attractive circulars, sample and show cards. The paints are put up in packages of 1, 5, 10, 25 and 50 gallons.

Dixon's Silica-Graphite Paints are thoroughly advertised and the qualities well known.

"LEATHER PRESERVATIVE."

One of the Countless Cases Where Dixon's Traction Belt Dressing and Leather Preservative Has Justified Its Name and Maintained Its Fame.

We have the following report from one of our salesmen which will be of interest to every belt user among the readers of GRAPHITE.

"Niles Fire Brick Company, Niles, Ohio. Mr. T. E. Thomas, proprietor, says that they have a twenty-four inch leather belt on which nothing but Dixon's Traction Belt Dressing has been used. This belt has run for twelve years and still retains its elasticity and 'life' and it has never been necessary to take a piece out of it to make up for stretch. Mr. Thomas thinks that this speaks well for Dixon's Traction Belt Dressing and Leather Preservative."

NEW JERSEY PARKS.

The sheep-like propensity of the average city dweller, to follow the crowd, is likely to take him year after year to Coney Island or Atlantic City for an outing, while other equally interesting places, which might add variety to the summer's experience, are overlooked. For people who like country scenes there is much pleasure in exploring the New Jersey parks. There are seven of these in and about Newark—Branchbrook, East Side, West Side, Orange, Wequahic, South Mountain and Eagle Rock Reservation.

Branchbrook Park is reached by trolley from the corner of Broad and Market streets, Newark. It is 280 acres in extent, and the southern part of it contains a lake, a wading pool for children, a play-field, and an English formal garden. The northern division is laid out in the form of a mimic wilderness. As in Central Park, all possible pains will be taken to preserve the wild atmosphere of the park for the pleasure of the public.

Less than an hour from the Broad and Market street corner is Short Hills, near which is the wild and beautiful South Mountain Reservation, which used to be a great hunting ground for wealthy New Yorkers. This is considered the finest of the chain of new parks.

If one desires an enjoyable "tramp," it is worth while to leave the trolley car at Maplewood and walk over to Union, which during the Revolution was called Connecticut Farms. An interesting old church, still standing here, figured in a battle fought in the neighborhood. The "fighting parson" of the church, James Caldwell, was in the front ranks of the American force, and when he found the wadding for the charges giving out, he hurried into the church and came out with his arms full of hymn-books. "Give 'em Watts, boys, give 'em Watts!" he shouted, and the leaves were torn out and used for wadding. At the "Old Meeker Inn," near at hand, Washington is said to have stayed.

—*The Week in New York.*

OVERSMART CHILDREN DIE YOUNG.

"The very smart child, the violin virtuoso, and the infant prodigy who can do such wonderful things in arithmetic—all die young. They are a flash in the pan, startling as lightning, begun and ended before we have ceased to wonder. The trouble is, they are overworked by greedy parents who find the dime museum offers of $500 a week more attractive than the welfare of the child. But extraordinary cleverness is a thing which should raise a suspicion when it comes to a business prodigy, who, perchance, is no longer an infant in years or in the ways of the world. We may find such a man, over seven, offering to sell the finest coffee in the world for fifteen, eighteen or twenty-five cents a pound. He has perfected some process or hokus-pocus whereby the virtues of cheap coffee beans are made to overshadow the finest qualities of the beans that bring twice as much in the market in the producing country. According to this genius, it is all a mistake to suppose that Nature has done more for one grade of coffee bean than for another. All coffee beans were created equal, if not free; the only thing that is needed to demonstrate that fact being his process of roasting."

The above is from *The Grand Union Herald*, published by the Grand Union Tea Co. of Brooklyn, who are interested in fine coffees and teas. It may, however, be equally applied to some of the so-called lubricating graphites that have lately attempted to come on the market through parties who have claimed to have materials and processes equal to Dixon's.

It must be true, without any doubt, that long years of experience in the tea and coffee bussiness is of great value. A knowledge of where Nature has done her best in producing teas and coffees, and the experience in the selection of such teas and coffees, and the knowledge in preparing them for the market in such a way that their virtues and qualities are best brought out, is indispensable.

It is equally true in the matter of graphite. Graphite in one form or other is found in all parts of the world, but Nature, in her processes, has varied greatly, and long experience and much knowledge are necessary to determine the most suitable uses for various graphites. Equal experience and knowledge are necessary in the preparation of them for their various purposes.

The smart ones and the prodigies that have come along with the assumption that without years of experience and knowledge, they have produced goods equal to Dixon's at less money, have died young.

It has been the painful duty of the Dixon Company, where the Dixon packages have been imitated and the Dixon labels used, word for word, to nip off the smart ones and prodigies a little while before the time when they would naturally have died, and the Dixon Company will continue to perform this painful duty in the interest of the public as well as in the protection of its own interests.

The Dixon Company welcomes honest, straightforward, wholesome competition;—the world is wide and there is room for us all—but engineers and users of graphite, for the protection of their own interests, should join hands with the Dixon Company against spurious graphites which not only work injury to engines and machinery, but also hinder the progress which Dixon's Flake Graphite is now making as a necessary if not indispensable lubricant for modern machinery.

DONE FOR SYMPATHY.

There was a "sympathetic strike" of Chicago teamsters that lasted for fifteen weeks.

Cost in loss of business,	$12,000,000.00
Cost to employers in wages,	2,100,000.00
Cost of strike to the unions,	300,000.00
Wages lost by strikers,	750,000.00
Cost to City of Chicago,	175,000.00
Cost to County,	100,000.00
Men thrown out of work,	4250
Persons injured during strike,	450
Persons killed,	21

The strike started over on attempt to hold sixteen little tailors who went out on a strike. There was at no time any question of wages or hours among the teamsters, but they went out on a sympathetic strike.—JOHN A. WALKER.

DIXON'S Graphite Pipe Joint Compound is indispensable to mechanic, pipe-fitter or engineer. Tight joints readily separated, bolts, bolt holes and nuts are free from rust, close-fitting flanges and gaskets, removable without destruction, and no hard lumps in piping to clog valves, are the characteristics of Dixon's Graphite Pipe Joint Compound.

WHEN YOU LAY UP YOUR AUTOMOBILE.

When you do not expect to make use of your automobile for some time, you can use some of Dixon's Graphites to great advantage.

Dixon's "Graphitoleo" has a wider range of uses than any other of the Dixon productions.

"Graphitoleo" may be used on the threads of the spark plugs in place of Dixon's Graphite Pipe Joint Compound, although the latter is preferable.

"Graphitoleo" is most highly recommended for chains, although Dixon's Graphite Chain Compound is better.

"Graphitoleo" is used as a dressing for engines and all exposed steel and iron work, as it thoroughly prevents corrosion and rust.

"Graphitoleo" is highly recommended for differential gears and for all working parts where perfect lubrication and protection from rust are desired.

"Graphitoleo" should be used on all roller bearings and ball bearings,—being made of the finest and smoothest flake graphite and vaseline it is unequaled as a lubricant, and proof against moisture and rust.

THE ORIGINAL GRAFT.

The first use of the word "graft" in New York occurred two hundred and fifty years ago. A small stream that led from a swamp through what is now Broad street was made into a ditch with the sides planked to form what is known in Holland as a "graft" or canal. Three laborers were employed on this job by the burgomasters, and a committee of five was appointed to supervise their operations and see that they gave full value for their pay. The completed graft was turned over to the Under Sheriff with these orders:

"He is ordered to take good care and superintendence of the newly constructed graft and also that the boats, canoes and skiffs be authorized to operate therein."

It is probable, notwithstanding the name, that there was much less graft in this graft than there has been in some of the subsequent water works which have been called something else.—*The Week in New York.*

GRAPHITE IN A GAS WORKS.

An Interesting Testimonial that contains a Valuable Suggestion for Gas Companies, for the Application of Dixon's "C. C. & G."

The following letter from the superintendent of a large municipal gas-plant will be worth a careful perusal by the readers of GRAPHITE. The formula given is well worth preserving.

KALAMAZOO GAS COMPANY,

174 S. BURDICK STREET, KALAMAZOO, MICH.

I am already an enthusiastic user of Dixon's Graphite and would like to learn still more about its forms and uses. Will you therefore be so kind as to send me your booklet "Graphite as a Lubricant" and likewise put my name on your mailing list for your monthly house publication, GRAPHITE.

I have found Dixon's Ticonderoga Flake Graphite invaluable for rubbing upon gaskets, ground and faced connections, for the lubrication of bearings and also as a paint. One of your most valuable graphite productions, however, is Dixon's Crucible Clay and Graphite Mixture, and I have become much attached to this material. I am glad to give you my formula for mixing up a cement with Dixon's "C. C. & G.", and in my sixteen years of practical experience in gas-making I've found nothing that could compare with it for making rust-joints, for flanged connections, for stand-pipes and best of all for putting the mouth pieces on retorts, which is one of the most important parts in constructing benches for the retort house.

2% by weight Flowers of Sulphur.
4% „ „ Sodium Chloride.
34% „ „ Cast Iron Borings.
60% „ „ Dixon's Crucible Clay & Graphite Mixture.

Mix this with concentrated ammonia or crude liquor in which sal ammoniac has been dissolved up to the 70% or 80% concentration, to the consistency of mortar. Stir thoroughly from time to time during forty-eight hours, when the mortar is ready for use.

Thanking you in advance for your publications, I beg to remain,

Very truly yours,

(Signed) A. M. DAME, Supt.

FIRST PRIZE LETTER.

To the New York World for Health Rules.

1—Think healthy thoughts.
2—Breathe deep and always through the nose.
3—Drink plenty of water between meals.
4—Eat moderately—masticate thoroughly.
5—Work hard and bathe often.
6—Relax both mind and body one hour every noon.
7—Associate with healthy people.
8—Study the "Law of Thought" and apply its teachings.
9—Relax every limb and muscle before dropping asleep.
10—Sleep in a cool, clean, well-ventilated room, eight hours at least out of every twenty-four.

ROBERT SPELMAN.

No 17 McTavish Street, Montreal.

PENCIL IN APPENDIX

Doctors Laughed at the Idea, But Found It Was So.

CHICAGO, September 26.—Robert Hanners, a baker twenty-four years of age, walked into the county hospital this evening and announced to the physician in charge:

"Doctor, two years ago I swallowed a lead pencil, and I believe it is bothering me a bit."

The doctor laughed at him but Hanners stuck to his story, and complained of a severe pain in his right side. His case was diagnosed as appendicitis and a case that required an immediate operation.

The pencil, five inches in length, and sharpened at one end, was found imbedded as Hanners had predicted. Hanners will recover.—*Baltimore American.*

OUR PRIDE REBUKED.

A Dixon salesman called recently on a concern—we won't say where—and the buyer, who was the proprietor, told him that he did not know there were in existence such articles as Dixon's Pencils, Dixon's Axle Grease, Dixon's Crucibles and Dixon's Stove Polish. We hang our heads and rend our clothes, we thought everybody knew it.—JOHN A. WALKER.

GRAPHITE FOR THE MOTOR.

The benefits of graphite lubrication for motor cars and motor boats are such as should hold the attention of every motorist. Dixon's Flake Graphite will greatly improve any system of oil lubrication.

This letter is a fair average of many received by us:

"HOUSTON, Texas.

"DEAR SIRS:—In response to yours of the 18th inst., I beg to say that I tested the samples which you sent, and was so pleased with the results that I have bought a supply of Dixon's Fine Flake Graphite and am using it for my automobile, mixed with my Cup Grease, and an occasional dust in the cylinders. It unquestionably increases the power and speed of the engine and decreases the gasoline consumption.

(Signed) S. L. MASSENGILL."

What Dixon's Graphite Motor Lubricants have done for others they will do for you.

Test samples and booklets free to all.

COMMUTATOR BRUSHES.

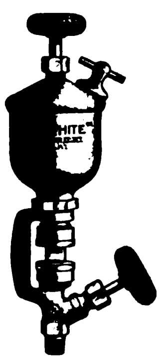
In reminding our readers, from time to time, as we do, of the merits of Dixon's Commutator Brushes for commutators, we probably cannot use words more forceful than those which come to us in renewals of orders:

"Please mail us twelve ¼ inch by 2 inch graphite brushes. I have been using these brushes over a year and have found them by far the most durable brushes on the market."

This comes to us from the superintendent of the City Electric Light and Water Works Company.

FEEDING FLAKE GRAPHITE ALONE.

The Advantages of Graphite in Cylinder Lubrication and an Account of a simple Cup which will interest many Engineers.



The possibilities and great advantages of flake graphite for internal lubrication of marine engines are doubly conspicuous, because ordinarily no cylinder lubricants are used in deep-sea practice. Most marine engines are designed to run condensing, and a great proportion of these vessels condense the steam for purposes of boiler feed. A moment's thought will show any experienced engineer the necessity of dispensing with cylinder oil as far as is possible because of the detrimental effects of oil, especially of compounded cylinder oils, upon condensers and boilers. Therefore it has been a widespread practice among marine engineers to almost wholly discard cylinder oils and rely upon the water of condensation for lubrication. They have wisely preferred the extra internal friction to lowering the efficiency and perhaps ruining condensers and boilers. To these men Dixon's Flake Graphite offers benefits and economies not to be found in any other known substance.

Years of use have proved its beneficial action as a cylinder lubricant, but there has been some little difficulty as to the most effective and reliable method of introducing it except in connection with oil. In the non-condensing steam plant oil is not objectionable and graphite and oil are used together in thousands upon thousands of engine rooms.

The philosophy of graphite alone as a cylinder lubricant is simple. Briefly it is that graphite coats, polishes and perfects the surfaces and keeps them in such perfect condition that the water of condensation becomes a sufficient fluid lubricant to yield good results.

We were recently looking over the advertisements in a marine journal published on the Pacific coast and our eye was attracted by an illustration of a graphite cup, which we knew was manufactured by the Lunkenheimer Company, as one of the illustrations in a page advertisement of the Vulcan Iron Works of Seattle, Wash., builders of engines and machinery; founders, machinists and dealers in engineer's supplies. Natually we were interested and wrote them to learn what success they were having with this lubricator and for such further facts as they might be willing or able to furnish regarding it. The following prompt reply interested us greatly and will interest our readers as evidencing the present growth of graphite lubrication.

THE VULCAN IRON WORKS,

SEATTLE, Wash., Nov. 21, 1904.

GENTLEMEN:—In reply to your favor of the 16th we are furnishing quite a number of graphite lubricators to different steamers running into Seattle, also the larger steam plants here, and from what we can learn they have proven very satisfactory. We bought nine of them fully two years before we sold one of them. During the last eight months we have sold in the neighborhood of about one hundred of these lubricators. We have been using your No. 2 Lubricating Graphite.

Yours very truly,

THE VULCAN IRON WORKS,

per H. P. Strictland, *Sec. and Treas.*

Naturally this reply was very gratifying to us and we called the attention of the Lunkenheimer Company to this letter. The manufacturers of this lubricator tell us that they have sold a large number of them throughout all parts of the world and that the success of the device has been demonstrated thoroughly over a considerable period of years, and that many enthusiastic testimonial letters have come to them from operating engineers.

There are many engineers whose engines are not equipped with lubricators that will handle flake graphite mixed with oil, who yet desire to use graphite as an auxiliary or accessory lubricant. Many of these have resorted to the hand pump with which they occasionally pump into the valves a mixture of Dixon's Flake Graphite and oil and tho' this method is a bit antiquated it gives good results. It is, however, open to the objection of feeding a quantity of graphite occasionally and it is self-evident that the graphite does not go as far or yield as satisfactory results by this method as if it could be supplied in smaller quantities steadily.

Again, there are engineers who would be very glad to do away very largely or wholly with oil lubrication for cylinders and valves (certain marine engineers and stationary engineers who have condensing facilities, yet cannot save condensed exhaust steam for boiler feed on account of the oil which cannot be separated from it) and to substitute graphite alone as a cylinder lubricant. Let it be understood in this connection

that there are many engines operating successfully today in whose cylinders the only lubricant supplied is Dixon's Ticonderoga Flake Graphite.

There are still other engineers, and these are chiefly operating upright marine engines, who do not, for many reasons, dare to use any cylinder oils and who in consequence carry heavy friction loads even tho' they have clean condensers and boilers.

These three groups of engineers will all find advantages in this lubricator which they may investigate to advantage. The principle upon which this cup operates is perfectly simple and in fact identical with that on which hundreds of engineers have constructed home-made graphite cups for many years.

There is, as shown in the illustration, a single connection to the steam chest from which steam enters the cup and, condensing, drips back carrying with it a little of the graphite each time. Suitable valves and drain cocks allow the cup to be opened and refilled at any time, and a pin-regulating device controls the feed. A short gauge glass enables the engineer to watch the rate of feed of graphite and water so that this cup apparently fulfills requirements.

The excellent results shown by No. 490 for a considerable period seem to justify not alone the maker's claims but the thorough approval of the Vulcan Iron Works as evidenced by their letter, and the hearty recommendation of the Dixon Company as well.

All those who may be interested in this No. 490 Graphite Cup will be supplied with full information upon application to the Lunkenheimer Company, Cincinnati, Ohio.

TO BE OR NOT TO BE.

I.

I sometimes think I'd rather crow
And be a rooster than to roost
And be a crow. But I dunno.

II.

A rooster he can roost also,
Which don't seem fair when crows can't crow.
Which may help some. Still I dunno.

III.

Crows should be glad of one thing, though;
Nobody thinks of eating crow,
While roosters they are good enough
For any one unless they're tough.

IV.

There are lots of tough old roosters, though,
And anyway a crow can't crow,
So mebby roosters stand more show.
It looks that way. But I dunno.

—*The National.*

THE extreme hardness of red lead that has "set", makes the breaking of a joint a risk to pipe, fitting, tools and muscles.

Dixon's Graphite Pipe Joint Compound will make a steam, air or water-tight joint resist heat, cold, acids or alkalis, will remain soft indefinitely, enabling joints to be separated with perfect ease without injury.

"A PLEASED CUSTOMER IS THE BEST ADVERTISEMENT."

The following Letters from a Canadian Machinist are Quite Self-explanatory.

First.

HALIFAX, N. S.

Please send to below address a sample of graphite grease such as you prepare for outside gears to reduce noise and wear. The machinery we are referring to is a large marine gas engine. Any literature on gas engines, marine paint, etc., will be greatly appreciated.

The writer is a steady user of Dixon goods but wants to recommend them to a man who will take care of a new installation when I am gone. As you have always been very accomodating in the past, I trust you will now.

(Signed) J. WALDO CARD.

Second.

I beg to acknowledge the receipt of your samples and literature. The most I can say for your product is that in my line of work I never go on a job without my can of Dixon's. First Dixon's No. 635 and then Dixon's Waterproof Grease, Elevator Grease and also a tube of Pipe Joint Compound.

The 635 I use in the cylinders, very small doses every two or three days. The elevator grease I keep on all gears, and we all know how to use pipe joint compound.

Your graphite is a great help to mechanics and works finely in gas engines after one has found the best way to use it on the motor he is running.

On many engines there has been a marked increase in power after I used Dixon's Graphite.

(Signed) J. WALDO CARD.

"MADE IN GERMANY."

A gentleman connected with a large industrial concern in Bremen, writes us among other things as follows:

"There are lots of good things 'made in Germany' but I find nothing in the way of lead pencils to compare with Dixon's Cabinet No. 2 lead pencil, with rubber on the end."

"SYSTEM RUN MAD."

The verses published in July, 1905, GRAPHITE, attracted a great deal more attention then we expected.

We have had reprints made as we have had many requests for copies of same. If any of our readers would like additional copies of the verses, we shall now be able to send them and will do so gladly.

A PROMINENT New York business man reports that while on a fishing expedition this August, in New Brunswick, the party landed from their canoe on a sand bar in the middle of the St. Francis River, twenty miles from civilization, and there he picked up a Dixon Black Lumber Pencil. He said the familiar sight was as inspiring as an American Flag.

The pencil had evidently been dropped overboard from a lumber raft, during the spring freshets.

The Dixon Company welcomes incidents of this character as indicating the widespread popularity of their products.

DIXON'S graphite publications are sent free upon request.

GRAPHITE CURES TROUBLE.

We're all in business for what we can get out of it honestly, but there's nothing that so lubricates the bearings of this ponderous and complicated machinery of business as a good appreciative letter from a satisfied customer.

The use of Dixon's Ticonderoga Flake Graphite brings us daily testimonials of good results in helping engineers out of trouble and we're always glad to print them in the hope that the practical suggestions they often contain will benefit someone of our readers. Here's a recent letter from Canada.

"I received your booklet, "Graphite Lubricants" and having read carefully I proceeded to test Dixon's Graphite on my engine here, which is a 25 horse-power used for pumping oil wells. For several months we have had trouble with grinding in the cylinder and both oil and tallow failed to give more than temporary relief. In the cylinder we commenced using your No. 635 Special Graphite mixed with ordinary crude petroleum through an ordinary Lukenheimer Lubricator. The grinding and noise has entirely ceased and the engine has been running smoothly and noiselessly ever since, proving to my entire satisfaction the high efficiency of your graphite as a cylinder lubricant.

"We have also been troubled with leaky pipe joints which kept the engine room continually damp. I had all the leaky pipes taken apart and the threads smeared with Dixon's Graphite Pipe Joint Compound, and since that time there has been no sign of a leak.

Very truly yours,

(Signed) W. F. TICHBORNE,

PETROLIA, Ont., Canada."

DIXON'S WATERPROOF GRAPHITE GREASE FOR FIRE HYDRANTS.

The fire hydrant is one of the most important parts of the Fire Department, as there are few things more troublesome at a fire than a rusty or a frozen fire hydrant.

Dixon's Waterproof Graphite Grease has been used on the caps and valves of fire hydrants by many water companies and has given general satisfaction.

We have received a number of very flattering testimonials from those who have used it and who state that its use has saved them much trouble and annoyance, and they always find the hydrants ready for use.

Dixon's Waterproof Graphite Grease for fire hydrants is made of the well known Dixon Ticonderoga Flake Graphite, the ideal lubricant mixed with the best waterpoof ingredients.

When this grease is applied to the valves or cap, it forms a coating that cannot be washed off even by the fast rushing stream of water, and it preserves the valves and the cap from rust and from freezing in the coldest possible weather.

The hydrant can be opened and closed with ease no matter how cold the weather or how long a period since it was last opened.

THE TRUE BUSINESS MANAGER.

BY EDWARD A. OLDHAM.

We have all heard of "the busy man." This term is too often another name for the man without a system, who is "busy" with minor details that should have been entrusted to competent employees. It takes the nerve that is the hall mark of executive ability to cut loose from the clock-winding minutia of any organization.

It is, therefore, an axiom that the man who hasn't got this nerve is not a natural born manager. The true test of the good manager is the amount of actual work he can deputize to subordinates whose fitness he has good enough judgment to discern. The divorcing of one's self from the smaller duties of a business presupposes the ability to judge men correctly. It presupposes the proper sub-division of duties, and the picking out of persons competent to be entrusted with these duties.

When once these persons are selected, they should be permitted in a measure to "work out their own salvation," under reasonable scrutiny, but not under an espionage that restricts all play of original effort or makes of a worker a mere perfunctory automaton. This sort of policy takes all the ginger out of the average worker. It dulls the edge of his mentality. Only the exceptional man can rise above this condition. He kicks off the restraint and seeks a larger field where there is greater latitude for the development of his incipient powers.

Yes, it takes the courage of executive ability to cast off minor duties and go about higher work. Columbus would never have discovered a new continent had he left the helm, and engaged himself with the smaller details of his squadron.

The man who holds on doggedly to the smaller work never grows in his business. Broader opportunities are shut out. His work degenerates. The man who entrusts the smaller work to a subordinate, and then hangs around all the time and practically does that work himself, does an injury to himself as well as to the subordinate. It takes the former off his pedestal and puts him on the same ground with his worker who no longer looks up. He loses his inspiration when responsibility and pride are gone.

—*Moore's Monthly Messenger.*

GRAPHITE FOR PNEUMATIC TOOLS.

THE GENERAL PNEUMATIC TOOL CO.,
PNEUMATIC TOOLS, COMPRESSION RIVETERS,
AIR COMPRESSORS, CRANES.

MONTOUR FALLS, N. Y.

GENTLEMEN:—

Replying to your letter would say that we use your No. 2 or finer flake graphite—on some of the bearings in our pneumatic hoists where there might be some possibility of their cutting before the bearings have run smooth. We also use it in our pneumatic riveters for the same purpose. We found that some of the men who operated these machines were negligent in oiling and some of the bearings in the toggle joints would sometimes be cut very badly on account of this. We found that Dixon's No. 2 Flake Graphite did away with this cutting and kept the bearings perfectly lubricated until they had run smooth.

We trust that this information will be of some benefit to you, and remain,

Very truly yours,

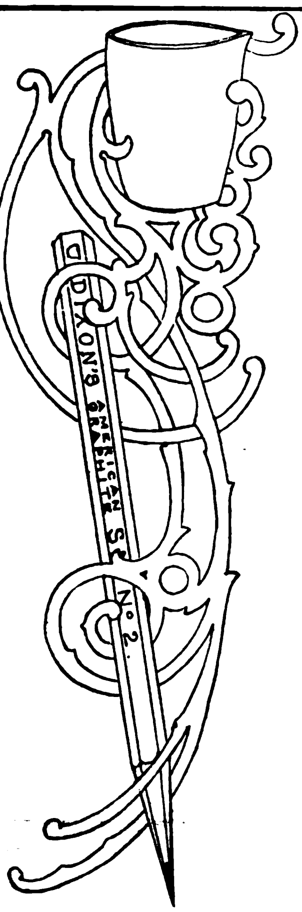
THE GENERAL PNEUMATIC TOOL CO.

(Signed) F. L. SCHLICK.

Graphite.

VOL. VIII. JANUARY, 1906. No. 1.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



IMITATIONS.

Most careful experiments by scientific experts and years of practical demonstration by practical experts, such as engineers and others, who have to do with lubricating machinery, have demonstrated beyond any question that amorphous graphite is in no way the equal of foliated graphite, such as Ceylon graphite or, better yet, Dixon's Ticonderoga Flake Graphite.

Dixon's Ticonderoga Flake Graphite is superior to the Ceylon foliated graphite in that the flake is very much thinner; this permits the building up of a far superior and more even, veneer-like coating to the bearing surfaces.

If any graphite should be found hereafter of the thinness and toughness of Dixon's Ticonderoga Flake Graphite, then, providing it is prepared with the same care as Dixon's Flake Graphite, there will be something equal to Dixon's. Until such graphite is found and as carefully prepared, there is today on the market no graphite equal to Dixon's Ticonderoga Flake Graphite.

All the above statement stands by itself, no matter who makes graphite or where it is made.

Good advertising, however; and persistency, count a great deal in introducing any article, and that is the reason why there are today several brands of graphite that the promotors are attempting to get on the market.

The Dixon Company has not attempted to meet these more or less worthless graphites by any condemnation or by any competition in price, but the Dixon Company is at all times ready and very glad to send samples that users may see the difference by comparison.

"A SOVEREIGN REMEDY FOR AMERICAN DISTRESS."

Bearing On the New Year.

The following is said to have been written about 1760 and is taken from the *New England Farmer* of 1824, at which time it was said it could be "relied on as the best prescriptions of Hippocrates or Galen:"

(1) When you incline to have new clothes, look first well over the old ones, and see if you cannot shift with them another year, either by scouring, mending or patching, if necessary. Remember a patch on your coat and money in your pocket is better, and more creditable, than a writ on your back and no money to take it off—and when you must buy new clothes, let them, I beseech you, be the produce of your own country; they will keep you warm, and, perhaps, last as long as the best pieces of cloth manufactured in Great Britain.

(2) When you incline to buy any Chinaware, chintzes, India silks, or any such baubles, I would not be so hard with you as to insist on your absolutely resolving against it; all I would advise is to put it off (as you do your repentance) till another year, and this, in some respects, may prevent an occasion of repentance.

(3) If you are now a drinker of punch, wine, ale, tea or coffee, twice a day, drink them but once a day during the ensuing year. If you now drink them but once a day, do it once every other day. If you do it once a week, reduce the practice to once a fortnight. And if you do not exceed the quantity as you lessen the times, half your expenses in these articles will be saved.

(4) And lastly, when you intend to drink rum, fill the glass half with water. If paper money in ever so great quantity could be made, no man can get any of it for nothing. Then the merchant's old and doubtful debts may be paid off, and trading becomes sure hereafter, if not extensive.

DIXON'S ETERNO.

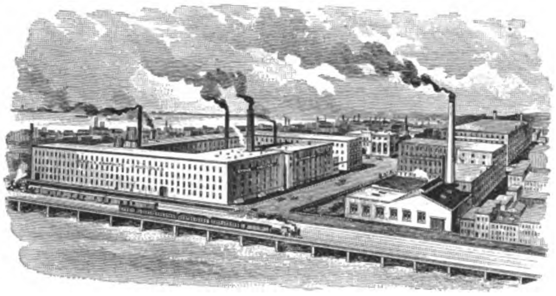
A Good Joke on a Western Stationer and Bookseller.

A witty friend of the Dixon Company called on a stationer and bookseller in a large Western city and inquired for Dixon's Eterno. The manager said, "Sorry, but we haven't it; we are trying to close out our books." Our friend thought he would try once more and on stepping into another prominent store, he was met by the floorwalker who said, "What is it, sir?" He replied, "I want Dixon's Eterno." The floorwalker directed him to the foreman of the book department. Our friend said, "You ask him for me, please." The floorwalker returned in a few moments, and, as politely as ever, said, "Sorry, sir, but we haven't it; are you quite sure that is the full title?"

YEARS of exposure to heat or moisture have not served to "set" Dixon's Graphite Pipe Joint Compound and have allowed old joints to be broken with ease. It goes further than red lead, makes tighter joints, and is ten times more useful to an engineer or pipe-fitter.

DIXON'S graphite publications will be sent free of charge upon request.

ESTABLISHED 1827. INCORPORATED 1868.



JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* JOHN A. WALKER, *Vice. Pres. and Treas.* GEO. E. LONG, *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., January, 1906.

THE ART OF HANDLING MEN.

We learn from the *World's Work* that it is the experience of those who have made it a careful study, that it is not a wise policy for the executive head of a business to do much, if any, detail work. He may think—and it may be so—that no one else can do the work as well as he, but he should be able to judge whether his subordinates are doing the right kind of work, and their reports to him should show to his trained mind whether the work has been properly performed.

He should see that they give details in their reports so concisely and correctly that they can easily be digested when they reach him.

The executive head should have the salesmen, the bookkeepers, the shipping clerks, and all of the working force, report to the heads of their several departments, and the executive head should require such heads to in turn condense the reports into intelligible statements for him.

The excutive head, by being systematic, will soon have a most satisfactory system at work, the success of which will mean his own success.

If the executive of an institution recognizes and encourages the heads of the various departments, they will in turn encourage those under them, and all of the machinery of the institution will run smoothly. Encouragement should be given all along the line, and all suggestions, no matter by whom made, should be listened to, for very often good suggestions are made by even the most lowly employees.

Above all other things, however, the chief excutive should bring into regular conference heads of departments, officers and factory committees and secure their ideas.

Regular conferences with the various salesmen should also be part of the system.

By so doing, the chief executive will have the benefit of the points of view of the men intimately in touch with the work that he is superintending. Even their inquiries and objections may be of value.

Another point in the management of subordinate heads of departments, is to provide everyone with an understudy.

WHY DID HE DO IT?

We sold a customer a small bill, and when due it was not promptly paid.

We reminded him by statement, and no answer.

We wrote a letter and still no answer.

We, after giving him notice, sent a draft to his local bank which was returned, marked "Refused." We called his attention to this by letter and not a word.

We then wrote a friendly letter explaining a forced collection was the only alternative and would be used in case he did not pay by a given date.

The given date passed, and no response. It then went to his local attorney and immediately thereafter he sent his check.

Now why did he do it this way?

His method is understandable if he had made up his mind never to pay; but intending, some day, to pay, as he finally did, why did he go—

First, through the process of disgrace with us?

Second, of disgrace with his local bank?

Third, of disgrace with his local attorney?

This we don't understand. —JOHN A. WALKER.

WHOSE DADDY IS THIS?

One of the Dixon boys says:

My noble dad is a good checker player. He doesn't drink, but once a year he comes to my house with a bottle and says, "Son, can you fill this up with whiskey? I don't know where to buy it, and you do." Wouldn't that jar you? He doesn't smoke and he doesn't "chew." He used to preach and was an ordained (whatever that is) minister, but got over it long ago, and I have forgiven him.

He is a promoter—has been rich lots of times and poor two times more than rich. Just now he is rich in either cash or conversation, I do not know which.

He is honest with a big H, and thinks everyone else is.

He is happy and healthy. All that I expect to inherit from him is that which I have already received—his love of the beautiful of the feminine persuasion. I am the second best of his sons—he has two.

"Is YOU hopin' fer de good times?"

"No; bless God. I got my sleeves rolled up, an' I is workin' for 'em."—*Atlanta Constitution.*

"IT PAYS TO BE SQUARE."

The above is one of the mottoes used in the late election in New York. It was an effective one and one around which all men were willing to rally. Its sentiment appealed to the best in every man.

It is one we most heartily commend to our would-be competitors in lubricants.

Let them have it framed and hung over their desks. Let them have it engraved on their hearts and seared in their brains,—it will pay them.

Mica and amorphous graphite are being boomed as wonderful lubricants, but when the exploiters of the first take as their text, "Mica is alive; graphite is dead," and the advocates of the amorphous graphite claim it as "The New Graphite Lubricant," and flake graphite as the "old graphite lubricant," they should not forget that mica and amorphous graphite were used and tested and found wanting, long before flake graphite was heard of.

Neither should they forget that well known experts like Professors Thurston, Goss, Kingsbury and others in the United States, and those of equal eminence in Europe, have made exhaustive tests of solid lubricants like graphite, soapstone and mica, with unquestioned results in favor of flake graphite,—and it was Dixon's each and every time.

The cries of our mica and amorphous graphite friends remind us of the old one, "Up Mars, down Eros." War may be unavoidable at times, and it may be that we shall have to get out our guns and shoot some facts into those who are making such an unwarranted outcry against flake graphite, but as Buster Brown says, "It is better to love your enemies and be good," —but don't tempt us too much.

AN AXLE GREASE TEST.

A Severe Comparative Test of Axle Grease in Which Dixon's Everlasting Graphite Axle Grease is Proven Superior to a Grease Considered as Standard, and the Best in the Market.

Sometime ago the Chief of the Fire Department in one of the large Eastern cities was asked to consent to a test of Dixon's Everlasting Graphite Axle Grease, and consent was given, but with the remark that it would be useless as they already had what they considered a standard grease, in fact the very best grease obtainable, and they did not believe there could be anything equal, much less superior.

In making the test, Dixon's Everlasting Graphite Grease was put on the left front-wheel and the right hind-wheel of an engine; the other grease was put on the right front-wheel and the left hind-wheel of the engine.

Later on in the test, this was reversed and the result we give in the words of the Chief of the Fire Department:

"Nothing was ever given a more severe and yet absolutely fair and impartial test, and nothing in my experience came out better and more absolutely satisfactory than the test of Dixon's Everlasting Graphite Axle Grease. I am sorry, however, to say that the people making the other grease are furious and they have gone so far as to charge the Fire Department with having 'monkeyed' with their grease. Anyway, Dixon's Everlasting Graphite Grease is on top and we shall hereafter use Dixon's Everlasting Graphite Axle Grease only."

POISONS.

Some Strange Things That Are Told About Them.

Snake poison would kill the strongest man if the smallest possible drop of it were injected into his veins or laid on a cut finger or chapped lip. But the smallest child might drink a teaspoonful—probably a glassful—without suffering the least injury. The same is true of most of the poisons savages inject into their arrows, and you can suck the dangerous wound with impunity.

Arsenic eaters become so accustomed to the use of this drug that one of them could eat as much of it in a week as would kill a troop of cavalry, horses and all. If a man took a dose of lunar caustic and his wife a dose of hydrochloric acid they would be subject for a Coroner's inquest in a very short time. But if either the man or the woman took both doses together the result would hardly be different from that of taking so much strawberries and cream. If two men each took a small quantity of hemlock one might drop dead—if he had a fatty heart—and the other feel only a slight inconvenience, if his heart was all right.

A singular case is actually on record of an Irishman and a Scotchman agreeing to spend their last sixpence and then poison themselves. The Irishman drank three pennies' worth of whiskey, followed it up with the poison and died in a few hours. The Scotchman decided to fortify himself for the last long journey with a bowl of porridge, with the result that he survived.

GRAPHITE LUBRICANTS.

Graphite lubrication is now a matter of importance in the mechanical fields. Operators of machinery of all kinds have found graphite lubrication to give results adding to the efficiency and lengthening the life of mechanical equipment to a most satisfactory degree. It is generally conceded that the credit for introducing graphite lubrication to its present condition of importance should be given to the Joseph Dixon Crucible Co., of Jersey City, N. J. This company has been engaged in the graphite industry for nearly fourscore years, and its experience and equipment enables it to produce graphite products which are most perfectly suited to the uses for which they are designed. It supplies graphite for every purpose for which it is used, handling the mineral in every form in which it naturally occurs, and offering it in a variety of forms for use. Instancing these uses may be mentioned for gas and gasolene engines, spindles and bobbins of textile machinery, scientific instruments, wood surfaces, axles, hoisting and other equipment exposed to the elements, motor chains and a multitude of others. "Graphite Lubricants" is the title of the latest Dixon publication, which should be in the hands of everyone who has occasion to use a lubricant of any character.—*Manufacturer's Record.*

FOR coating gaskets and flanges, Dixon's Graphite Pipe Joint Compound is especially useful and valuable, saving many times its cost in sheet-rubber, keeping connections perfectly tight, preventing rust and sticking.

Pipe joints and nuts screwed up with it will always come apart readily and be as bright and clean as the day they come from the die.

THE LOCATION AND USE OF FRICTION CLUTCHES.

By W. H. Wakeman.

Chapter I.

Attention is so frequently called to the advantages derived from the installation of machinery for the electric transmission of power, that the benefits of friction clutches are overlooked, yet there are many points to be considered in this connection that will be presented in these chapters for the benefit of men who contemplate the erection of new plants, also those in charge of plants already in use, who seem to have failed to discover some of the principles involved.

Fig. 1 illustrates the outboard bearing and fly wheel of an 80 horse power engine, driving a jack shaft *2* in the usual way. This drives the main line shaft *3* by means of a suitable belt.

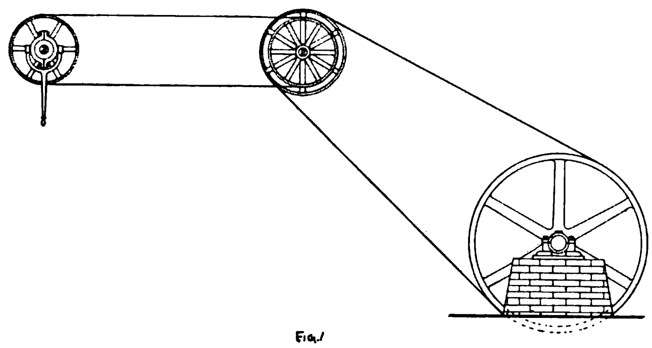


Fig. 1

The latter is fitted with a clutch pulley as shown, so that it may be stopped at pleasure, for it should be remembered that a clutch pulley is one that can be made either tight or loose on the shaft according to requirements in the mill or factory, which is much more practical and convenient than to shift the belt from one pulley to another according to common practice on small countershafts.

The line shaft *3* extends the whole length of a machine shop, and the lever of the clutch shown is fitted with a small strong rope supported on pulleys, and extending the whole length of shop, so that in case of accident to a belt or a pulley, by pulling the rope the machinery is brought to a standstill as quickly as it could be if driven by electric transmission of power and it was only necessary to pull out a switch.

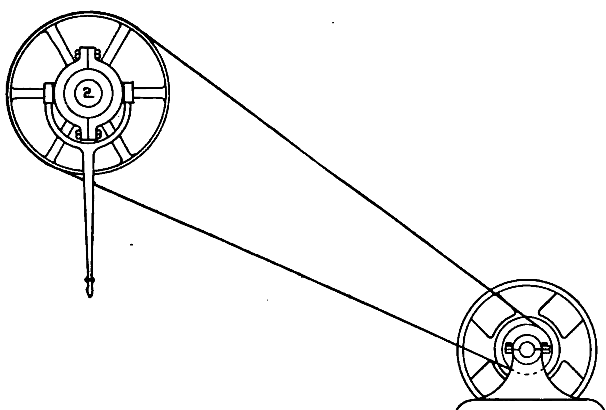


Fig. 2

It will be noted that in this case the clutch is on the line shaft, consequently the pulleys and the belt are always in motion during working hours whether the clutch is in or out. It might have been located on the jack shaft *2*, in which case the pulleys and belt would have stopped when the clutch was out. The reasons for its present location are as follows: When this clutch is thrown in, it puts in motion a long line of shafting, several belts and under certain conditions another shaft with pulleys, belts, etc., as will be explained later. The inertia of all this machinery is great, hence it brings much strain upon the belt, and where a pulley is held in place by two set-screws turned down onto the shaft, it sometimes results in a very coarse thread being cut on the shaft, where it is not wanted.

With the arrangement shown in Fig. 1 the inertia of the pulleys and belt helps to overcome the inertia of the rest of the machinery, hence one partly counterbalances the other.

As the term "inertia" will be used several times in these chapters it may be well to explain that it has a kind of double meaning. If a shaft is standing still and measures are taken to start it, the property which resists this change is its inertia. When a shaft is in motion and an effort is made to stop it, we say that the momentum of it must be overcome, but well informed engineers have claimed that this is not strictly correct because an analysis of the word "momentum" does not prove it consistent with this application of the term. The property of matter (whether it is a long line of shafting or anything else) which tends to keep it in motion after it is fairly started, is its inertia.

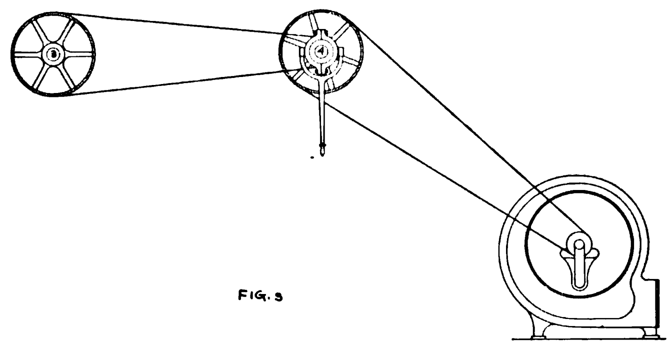


Fig. 3

When the clutch on *3* is thrown out and the shaft stops, the pulley continues to revolve, hence oil in its chambers is agitated and thrown upon its shaft, thus giving continuous lubrication with all of its advantages. As the pulley is in motion, the wear due to years of service is evenly distributed over its inner surface, hence it is not thrown out of balance.

The shaft *2* in Fig. 2 is the jack-shaft already mentioned. The illustration shows a clutch pulley near one end of it, driving a dynamo. When this clutch is thrown out, the pulley stops (after its inertia has been overcome), and oil in its chamber settles to the bottom while the top of it rests upon the revolving shaft, needing more lubrication at this point than it always gets.

However, with this exception it makes a very good arrangement. As there is no load on a dynamo when first started, the inertia in this case is small so that the clutch may be thrown in without loss of time, for it affects the engine but very little.

As this dynamo is located on a short track with adjusting screws for regulating the tension of belt, friction of the pulley when the clutch is thrown out, is rendered very light by loosening the belt.

As this engine is used to drive machinery in both wood and iron working shops during the day, and the dynamo is wanted at night after the shops are shut down, these clutches are very convenient. I was once employed as engineer in a place where similar service was required, but the cost of clutch pulleys had prevented their installation, hence much shafting and a score or more of belts were kept in motion for many hours when they were not wanted.

The shaft *3*, Fig. 3, is the main line shaft mentioned in connection with Fig. 1. The pulley drives a long countershaft *4* and two machines, one of which is shown in the illustration. There is a clutch pulley on *4* which enables the engineer to stop this shaft when the machines are not wanted. The inertia to be overcome when this clutch is thrown in is considerable, as the machine shown revolves 2000 times per minute, and as a matter of course, the inertia is greater for a high than for a low speed machine, when full speed is considered in both cases.

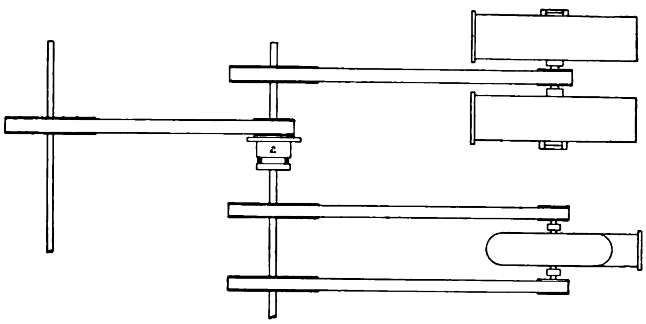


FIG. 4

It is always desirable to start idle machines with as little reduction of engine speed as possible, for changing the speed of machinery means loss of production in all cases and damage to stock of some kinds. On this account a report of the following experiment will prove valuable.

The dynamo in Fig. 2 was started and the potential carefully noted when the clutch *4*, Fig. 3, was out. This clutch was then thrown in, not suddenly, as it might have been, but without much loss of time. The potential was reduced 30 volts. It was thrown out again and the potential noted. It was then thrown in very carefully so as to avoid picking up the load suddenly and the potential was reduced only 10 volts. Inasmuch as the reduction of potential under such conditions is a true comparative indication of the reduction of speed, it shows that it pays to be careful in such matters.

However, it is necessary in all such cases to use good judgment, for the fact that several minutes are required to pull in a clutch does not prove that it was done properly. The lever may be pulled in enough to start the shaft and run it at a low speed, which is not increased for perhaps a minute, during which time the friction due to difference of speed is excessive. The lever may then be pulled a little farther, causing increase in the speed, but still the difference causes the parts to heat and wear rapidly, especially if some of them are made of wood. It is then given a quick pull, causing the belt to shriek, and bringing the shaft up to full speed.

The correct method is to pull the lever in slowly, but keep it in motion until full speed is attained. This gives the governor on the engine time to act, thus preventing sudden reduction of speed. It is just as much an exhibition of science to pull in a heavily loaded clutch properly, as it is to start a street railway system into operation.

Sometimes the clutch on *4*, Fig. 3, is left in, while the engine is running the dynamo only, in Fig. 2. If the clutch *3*, Fig. 1, is thrown in suddenly, it brings excessive strain on all parts concerned, which should be carefully avoided.

Fig. 4 is a plan of the main line shafting, and the long countershaft already mentioned, which drives a blower by means of two belts, and an exhauster by one belt.

When it is remembered that it is possible to stop all that is shown in this illustration, and the long main line shaft, only a small part of which appears here, it will be plain that the inertia to be overcome when throwing in the clutch *3*, Fig. 1, is enough to cause trouble if it is not done very gradually.

Fortunately, this inertia may be divided into two parts by throwing out the clutch *2*, Fig. 4, until the main line shaft is started and given full speed, after which the countershaft may be started.

(*Concluded next month.*)

DO THEY?

"Why do people bite lead pencils?" inquired the seeker after truth.

"To get a literary taste, of course," replied Mr. Conn.

—*Exchange.*

ABRAHAM LINCOLN, Secretary Chase, and Attorney-General Bates were one day going out from Washington to Tennallytown to see General McClellan review the Pennsylvania Reserves, when some one commented on the fact that Bates's hair had retained its original dark color in perfect freshness, while his beard was almost white. When asked, Mr. Bates said he knew no especial reason for it. But Lincoln exclaimed, laughingly, "Why, don't you know? It's because he uses his chin more than he does his head."

A GREAT AMERICAN WRITER AND ARTIST.

A straight American am I—
You see the point?—It's dark;—
Yet nevertheless the world knows well
That I have made my mark;
I'm nearly thirty-three years old—
Was born in '72—
Yet many a time I've scratched a vote
And helped elections through.

You probably have never heard
Of one as young as I,
Who lowly born, has reached a point
Of fame and name so high,
'Tis not conceit, 'Tis simple truth,
I've had a queer career;
And, if you listen, you'll approve
Of every word you hear.

When I was but a few days old
They sent me off to school;
This sharpened me—I wrote essays—
Broke not a single rule.
I wrote the answers to all sums—
All questions hard or plain—
There never was a written wrong
I could'nt write again.

Ere I had been in school a week
They put me in a bank,
And then I raised a check and raised
The "devil," O, 'twas rank!
I footed columns—balanced books—
I helped the whole concern;
Took short-hand notes and wrote them out,
Got nothing in return.

And so I quit and tried the law—
Wrote briefs and testimony:
I drew up wills and codicils
And pleas for alimony.
I wrote indictments by the score—
Wrote many a judge's sentence
And many a criminal's story of
Confession and repentance.

I quit the law for medicine—
And here I wrote prescriptions
Which cured humanity of ills
Of all sorts and descriptions;
And having won renown in this
To theology then I took,
In which I wrote rare sermons and
A great religious book.

I am an artist who can draw
All things of life and death
Exactly as they are, save two,
Viz:—Salary and breath.
I am familiar with all men—
The poor, the great, the rich;
I write all languages of earth
With ne'er a halt or hitch.

A straight American am I—
I'd have you understand.
I've been in every office of
This great and mighty land,
For I'm a Dixon's Lead Pencil—
A writer; artist too,
And none can do without me, sir,
Not one—not even *you*.

NOISY GEAR WHEELS.

We read in *Southern and Western Textile Excelsior* that the difference between noisy gears and quiet gears is often so slight that an expert cannot decide, by mere inspection, to which class a given pair of gears belongs. Both kinds are not infrequently produced in the same lot. The constructor of gears has a peculiar anxiety—he is not at all concerned as to the geometrical movements of his gearing so long as it will keep quiet. He has various devices, other than the correct shaping of the teeth, with which he hopes to avoid disagreeable sounds; if he has slight power to transmit, he may choose a fine pitch for the teeth; he may make his gears of brass, sometimes of rawhide and again of compressed paper.

One of the details of construction that may cause noise is that the depth of the tooth spaces is not right. In this respect gears are often cut too deep than not deep enough, and it is worse to have the driver too deep than the driven gear. Another cause of noise may be that the cutting is not central. This may be shown by gears being noisy in one direction and quiet when running in the other direction. Again, the centre distance may not be right; if meshing too deep, the outer corners of the teeth of one gear may strike hard against the roots of the teeth of the other gear. Still another reason for noise may be found in the fact that the frame carrying the gear shafts may be of such form and size as to give off sound vibrations.

A properly prepared graphite lubricant is the best antidote for noisy gears. The trolley companies make large use of Dixon's Graphite Wood Grease and the regular graphite grease is used for gears in other places.

TWO CLOCKS.

Down near the City Hall, New York, there is a clock under the sidewalk, and very few people know it is there. Occasionally, however, some man is seen to take out his watch and look intently at the ground, and then those who stop to see what he is doing find out that he is setting his watch by the underground clock. The glass which covers it has been scratched and soiled until it looks like ground glass.

The other queer clock is far uptown and is on, not under the sidewalk. It is merely a reflection of a clock face, thrown on the ground by some mysterious arrangement of lights. The affair is said to be imported from Germany, but no one has yet discovered just how the effect is produced.

—*The Week in New York.*

HOW TO LIVE TO BE 70.

Mark Twain Tells How to Reach Threescore and Ten by not Following the Rules of Other People. What is Good for Some One Else May Assassinate You.

Mark Twain's seventieth birthday was celebrated at Delmonico's, on December fifth. He gave up most of his speech in teaching the others how to live to be seventy. Here is some of his advice:

"We have no permanent habits until we are forty. Then they begin to harden, presently they petrify, then business begins. Since forty I have been regular about going to bed and getting up—and that is one of the main things. I have made it a rule to go to bed when there wasn't anybody left to sit up with; and I have made it a rule to get up when I had to. This has resulted in an unswerving regularity of irregularity. It has saved me sound, but it would injure another person.

"In the matter of diet—which is another main thing—I have been persistently strict in sticking to the things which didn't agree with me until one or the other of us got the best of it. Until lately I got the best of it myself. But last spring I stopped frolicking with mince pie after midnight; up to then I had always believed it wasn't loaded.

"And I wish to urge upon you this—which I think is wisdom—that if you find you can't make seventy by any but an uncomfortable road, don't you go. When they take off the Pullman and retire you to the rancid smoker, put on your things, count your checks, and get out at the first way-station where there's a cemetery.

"I have made it a rule never to smoke more than one cigar at a time. I have no other restriction as regards smoking. I do not know just when I began to smoke, I only know that it was in my father's lifetime, and that I was discreet. He passed from this life early in 1847, when I was a shade past eleven; ever since then I have smoked publicly.

"To-day it is all of sixty years since I began to smoke the limit. I have never bought cigars with life-belts around them. I early found that those were too expensive for me. I have always bought cheap cigars—reasonably cheap, at any rate. Sixty years ago they cost me four dollars a barrel, but my taste has improved latterly, and I pay seven dollars now.

"As for drinking, I have no rule about that. When the others drink I like to help; otherwise I remain dry, by habit and preference. This dryness does not hurt me, but it could easily hurt you, because you are different. You let it alone.

"I have never taken any exercise except sleeping and resting, and I never intend to take any. Exercise is loathsome. And it cannot be any benefit when you are tired; I was always tired. But let another person try my way and see where he will come out.

"I desire now to repeat and emphasize that maxim: We can't reach old age by another man's road. My habits protect my life, but they would assassinate you."

HOW THEY SAY IT IN SPANISH.

"One good term deserves another" is well expressed by "One should pay love with love."

"Look before you leap" is brought home to the young man and woman by "Before you marry look at what you are going to do."

"A hog is always a hog" is well matched by "A monkey dressed in silk is still a monkey."

"He drinks like a fish" is even better expressed by "He drinks like a drunkard." The spanish word for drunkard is cuba, which also means cask. So the proverb may be rendered "He drinks like a cask."

"A wise head keeps a close watch" is very fittingly matched by "Flies do not enter a closed mouth."

Instead of "When you are in Rome do as the Romans do," they say, "Wherever you go, do as you see."

We say, "Hunger is the best spice." The Spaniard says, "Hunger does not find the bread hard."

"Out of sight out of mind," is rendered by "There are no friends to those dead and gone." Neither way is always true.

"A foolish question requires no answer" is boiled down into, "Foolish words, deaf ears."

"A word to the wise is sufficient," is cut in half by "Half a word is enough to him who understands."

"A bird in hand is worth two in the bush," is multiplied by the Spaniard who says, "A bird in the hand is more valuable than a hundred flying."

Those who call upon their saints for help are told to remember that, "If God is not willing, the saints are unable."

OF INTEREST TO LUMBER COMPANIES.

A Test of Dixon's Graphite Axle Grease Which Should Be Attractive to All Lumber Dealers.

One of the largest wholesale lumber companies in the State of New York, writes us as follows:

"It may be of interest to you to know the results we have attained with the use of Dixon's Graphite Axle Grease.

"In our business we use one hundred and seventy rear trucks and six forward trucks.

"These trucks were greased on May 1st and again about August 1st, and are now ready for their third greasing.

"We have handled with these trucks from our dock to yard and from yard to mill since the 1st of May, approximately thirty-five million feet of lumber, loading about 2000 feet of lumber at a time on each truck, and all this time the axles of the trucks have been thoroughly lubricated.

"For economical results we do not believe that there is an axle grease that can equal Dixon's."

While we do not as yet feel at liberty to publish the name of the lumber company, we shall be very glad to furnish it to anyone who may be interested.

THE best rubber packing ever cut into gaskets will stick to manhole plates and flanges after it has been heated.

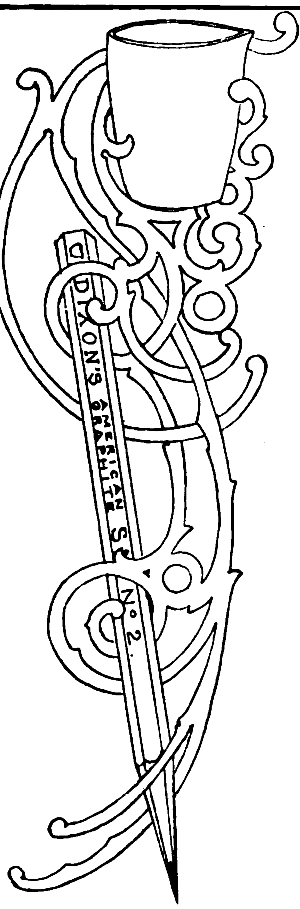
Coat it with Dixon's Graphite Pipe Joint Compound and the joint may be broken as often as you please without injury to the gaskets.

Threaded joints, bolts, packing glands, etc., are good places for it.

Graphite.

Vol. VIII. FEBRUARY, 1906. No. 2.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



PUTTING A PUMP IN GOOD CONDITION.

An Experience Well Told and Well Worth Careful Reading.

Having lately become a recipient of the monthly issues of GRAPHITE, I feel moved to add my testimonial to the good qualities of "Dixon's" Flake.

In one place where I was employed as fireman, I had charge of a 6 x 4 x 6-inch duplex steam pump used for boiler feeding with a suction lift of about 15" and working against a boiler pressure of 120 pounds.

The pump was fitted with a half-pint "Detroit" sight feed lubricator, for lubricating the steam valves and cylinders. It had been the custom of my predecessor to fill this lubricator and regulate the feed "about so fast." Under this method the half pint of oil would last anywhere from three to six hours, according as to whether it was subjected to cold or warm "drafts" of air, as no further attention was paid to it until the lubricator was empty, which fact was made apparent by the sight feed glass being filled by an emulsion of distilled water and cylinder oil. The glass was then blown out, the lubricator refilled and adjusted as before.

My first move was to find out how much oil the pump really required, and after experimenting about a week, found that the least quantity that was practical to use, was one lubricator full per run of eleven hours, the pump being run continuously that length of time at about 30' per minute average piston speed.

Having heard and read of Dixon's Pure Flake Graphite being excellent for cylinder lubrication, I decided to obtain some and give it a trial. I made my wants known to the superintendent, and a five-pound can of No. 2 was on the scene shortly. In the meantime I took a 1/4" globe valve, and found a solid brass oil cup with screwed cover and 1/4" connection on bottom end, which I screwed into one side of the globe valve, and as steam chest bonnet of pump was already drilled and tapped, I had only to remove the plug and substitute a 3/4"×1/4" reducing bushing, a close nipple, the globe valve and cup, and my graphite lubricator was complete. I mixed my graphite compound in the proportions of one level teaspoonful of graphite to nine of cylinder oil, and commenced to give my medicine in spoonful doses, three times per day, and one on retiring, and at the end of a week found that the dose could be reduced to two teaspoonfuls, one about the middle of the run and one about fifteen minutes before stopping. I had not forgotten about the sight feed lubricator while all this was going on, but found that the half pint would last two days, with no complaints from her ladyship, the pump, so I kept on squeezing down on the oil until I reached a two weeks' run, and as that was as close as I could practically regulate the feed, I let it go at that. I really think the pump would have been sufficiently lubricated with the graphite mixture alone, but did not try it, as I had already devoted as much of my time in that pump room as I could spare from my other duties, too numerous to even hint at in this article. I wish to speak of another point in connection with this graphite lubrication, and that is, the increased life of the packing in the valve stem and piston rod stuffing boxes. This pump required all new packing about every four weeks, a good quality of gum-core packing being used. After using the graphite mixture, the piston rods took on such a nice polish that the old packing was not removed, but one turn was put in whenever there was room for it, about once in four or six weeks. I had such good results from my first experience with "Dixon's" Flake, that I then and there drew up resolutions to use it wherever it was suited to the purpose, proved by experiment, and so have two or three other experiences up my sleeve. "ECONOMY."

"SYSTEM."

System is a fine thing, but sometimes it is "love's labor lost."

We had an order out for a quantity of tools, and several days after the arrival of the tools we received a "card system" notice that the shipment of the tools had been delayed but we would receive them "next week."

We had an order out for a new set of harness, and some time after we had had the harness on our team pulling goods to the shipping point, we received a filled-out form to the effect that there was a strike among the harness men and that we might expect some delay in the delivery of the harness. All this forcibly reminded us of the verses in GRAPHITE of July, 1905, "System Run Mad."

NEVER a good practice, and today a very bad one, is that of fitting pipes with red lead.

Dixon's Graphite Pipe Joint Compound cannot "set," will not weld a joint, never allows a bit of a leak or rust in its presence, and makes changes in piping, etc., possible without wholesale destruction.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

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JERSEY CITY, N. J., February, 1906.

WHAT WATER CAN DO.

Imagine a perpendicular column of water more than one-third of a mile high, twenty-six inches in diameter at the top and twenty-four inches in diameter at the bottom. Those remarkable conditions are complied with, as far as power goes, in the Mill Creek plant, which operates under a head of 1,960 feet. This little column of water, which, if liberated, would be just about enough to make a small trout stream, gives a capacity of 5,200 horse-power, or enough power to run a good-sized ocean-going vessel. As the water strikes the buckets of the water-wheel, it has a pressure of 850 pounds to the square inch. What this pressure implies is evidenced by the fact that the average locomotive carries steam at a pressure of 190 or 200 pounds to the square inch. Were this stream, as it issues from the nozzle, turned upon a hillside, the earth would fade away before it like snow before a jet of steam. Huge bowlders, big as city offices, would tumble into ravines with as little effort as a clover burr is carried before the hydrant stream on a front lawn. Brick walls would crackle like paper, and the hugest skyscrapers crumble before a stream like that of the Mill Creek plant. It takes a powerful waterwheel to withstand the tremendous pressure. At Butte Creek, Cal., a single jet of water, six inches in diameter, issues from the nozzle at the tremendous velocity of 20,000 feet a minute. It impinges on the buckets of what is said to be the most powerful single waterwheel ever built, causing the latter to travel at the rate of ninety-four miles an hour, making 400 revolutions a minute. This six-inch stream has a capacity of 12,000 horse-power. The water for operating the plant is conveyed from Butte Creek through a ditch and discharged into a regulating reservoir which is 1,500 feet above the power-house. Two steel pressure pipe lines, thirty inches in diameter, conduct the water to the power-house.—*The World To-day.*

GRAPHITE AS A CYLINDER LUBRICANT.

Cures a Persistent Knock and Saves Two-Thirds of the Former Oil Feed.

PETROS, Tenn.

The Joseph Dixon Crucible Co.,
Jersey City, N. J.

GENTLEMEN:—Replying to yours of recent date, would say that I have received samples of flake graphite, and booklets. Have tested the samples in cylinder of engine with which we were having a little trouble, due to frequent knocking. Some of the graphite was mixed with oil and the cylinder given a coat of the mixture. Oil and graphite thoroughly mixed was pumped into the cylinder whenever knocking occurred, until now it has almost entirely ceased. The oil feed has been cut down to less than one-third of what was used before using the graphite. This, together with the benefit above mentioned, I consider due to the use of Dixon's Flake Graphite. I have ordered a supply of No. 2 Flake Graphite, which I feel assured will entirely eliminate all further trouble. Yours truly,

(Signed), W. F. BURT,
Mining Engineer.

The above letter is of the kind that nearly every morning's mail brings. Dixon's Graphite is the greatest trouble-saver to be found, and its use means economy every time. Graphite lubrication for engine cylinders is an excellent habit to form, and one that is rarely, if ever, broken.

AIR BRAKE LUBRICATION.

The Joseph Dixon Crucible Co., Jersey City, N. J., has issued a new publication entitled "Air Brake Lubrication," with a description of the properties, uses and special advantages of Dixon's Ticonderoga Graphite, Air Brake and Triple Valve Grease, and Dixon's Special Graphite, No. 635. The statement is made that Dixon's Graphite, Air Brake and Triple Valve Grease, prepared according to the suggestions of air brake experts, has, after long and thorough tests with greases of various compositions and densities, been adopted by one of the leading trunk lines of America. Scientific tests of Dixon's Graphite on triple valves have thoroughly demonstrated its value. Useful information and full directions for using are contained within the pages of this little book, which should be in the possession of every person having to do with air brakes.

—*Locomotive Firemen's Magazine.*

THERE are extensive uses for the Dixon graphite products among shipbuilders, ship owners and brokers. Crucibles, facings, and lubricants, pipe joint compound and pencils, for example.

DIXON'S GRAPHITE JOINTING COMPOUND.

What Our Customers Say.

Any manufacturer can say good things about his own products, but it's what the customer thinks and says that counts after all.

Much more convincing than our own claims are the good words of those who have been using Dixon's Graphite Pipe Joint Compound for years.

Here's what they say:

The Manufacturer says: "I find that Dixon's Graphite Pipe Joint Compound saves time for my men, saves fittings, saves tools and therefore reduces expense and annoyances for me. Better work is done, fewer complaints are made, and I'm thoroughly satisfied in every respect that Dixon's Compound is not only better, but far more economical, than any other material for the same purposes."

The Engineer says: "I wouldn't be without Dixon's Compound, for it certainly does everything you claim for it. All my piping is tight and the joints do not rust and stick or have to be broken open whenever I make a change or repairs. It is the best thing I ever found for boiler hand and manhole plates, for bolts, nuts, studs, flanges, metal gaskets, and places of that sort. I never overhaul an engine or pump without using a can of Dixon's, and never again will I go back to red or white lead, or anything of that kind."

The Steamfitter says: "The great advantage I find in Dixon's Compound is that the graphite lubricates the threads so that the joint makes up half a turn to a full turn further than if I used red or white lead or machine oil on the threads. That means good, tight work in the first place, and no going over the job a second time to tighten leaks. It is much more economical than red or white lead, and a great deal better than any of its imitations."

The Railway Master Mechanic says: "A locomotive shop or roundhouse is about as fine a place for Dixon's Compound as one could find, and Dixon's is the best article of its kind I've ever employed. We smear it on studs, bolts, nuts, boiler plugs, stay bolts, steam and air joints, hose connections, and all kinds of threaded joints, and I would not willingly be without it. Red and white lead and other cement-like substances may suit some, but I prefer to *lubricate* the joints I make, and Dixon's Graphite Compound is my first choice."

The Plumber says: "One doesn't realize what a bad habit it is to use red or white lead on a pipe thread, until called upon to open an old joint made up with one or the other. I've broken many tools, bent wrenches and tongs, twisted and spoiled lots of pipe, and strained my arms, trying to unscrew old red or white lead joints, and generally have had to break the fitting with a hammer and chisel. You don't have that trouble with graphite, for the threads are always lubricated and come apart nicely without spoiling pipe or fittings. There's nothing I ever found to take the place of Dixon's Compound."

The Mine Superintendent says: "Dixon's Graphite Pipe Joint Compound has saved us money and trouble ever since we began to use it, and we keep a good supply on hand. We have to run a great many temporary pipe lines, and nothing so facilitates rapid, tight work and enables us to use pipe and fitting over again and again like Dixon's Graphite Compound. Whether the joint is for steam, compressed air, or water, it is always made up with Dixon's. When one can easily open the joints of a water pipe that's been badly rusted with acid mine water, it is good proof indeed of your claim that graphite prevents rust and corrosion under the most trying conditions."

The Gas Company says: "We long ago saw the wisdom of forbidding our pipe fitters to use anything but Dixon's Graphite Compound, and have saved money on pipe and fittings, meter and fixture connections ever since. For underground work there is nothing equal to it as a rust preventive. The superintendent of our works uses it for cementing the doors of gas retorts and for such places where the heat is excessive, and he says that nothing stops the leakage of gas quite so well. Really, a gas company cannot well afford to be without Dixon's if they are trying for economy and the best results."

The Joseph Dixon Crucible Company, makers of Dixon's Graphite Pipe Joint Compound, says: "We ourselves have used this product for nearly thirty years in all our mines and mills on Lake George, in our Cedar Mills in Florida, and throughout our great factories in Jersey City. We know from long experience that its value is great in every factory, shop, engine room and mill."

Try Dixon's Graphite Pipe Joint Compound. You are sure to be pleased.

Dixon's Graphite Pipe Joint Compound is a paste chiefly composed of the famous Ticonderoga Flake Graphite, from the mines owned and operated by the Joseph Dixon Crucible Company, combined with suitable binders. Graphite has high lubricating qualities, is an efficient rust preventive, and is quite unaffected by extremes of heat and cold, by moisture, acids or alkalies.

Dixon's Graphite Compound is sold ready mixed for use.

THERE are many cases recorded where cylinders so badly out of true, so badly scored and scratched as to be recommended for reboring, have, with a few small doses of Dixon's Flake Graphite, become as smooth as glass and snugly fitted to the piston, saving the expense of reboring and affording a degree of lubrication never attained by oil or grease alone.

THE LOCATION AND USE OF FRICTION CLUTCHES.

By W. H. Wakeman.

Chapter II.

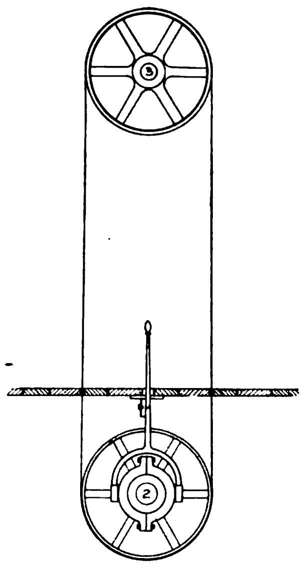


Fig. 5

Fig. 5 appears like a large band saw, but it is not. The lower pulley carrying the clutch is on the main line, shaft *2*, in a machine shop. It drives by a vertical belt, a pulley on a line, shaft *3*, which extends nearly the whole length of the room above. There are many days in which machinery on this floor is not used, therefore it is not necessary to run the shafting and belts.

The lever of this clutch extends above the floor where it can be reached readily, hence it is very easy to start and stop everything on the upper floor, either when it is not wanted for an hour or a day, or in case of accident, such as a belt being wound up on the shaft, or two belts becoming entangled. Such small accidents frequently happen here because the pulleys are located very close together. A quick pull on the clutch lever stops the machinery as quickly and almost as easily as if electric transmission of power was used, requiring only the shifting of a switch.

So far as the clutch is concerned this is an ideal arrangement, for when idle it is suspended by the belt from the pulley above, therefore the friction is reduced to a minimum, requiring but little lubrication.

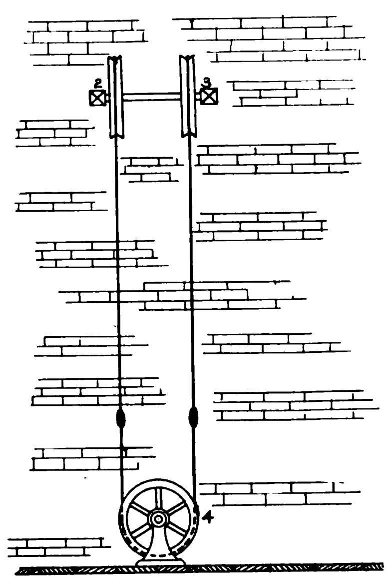


Fig. 6

Clutch pulleys in the shops where these illustrations were taken from, are fitted with a reservoir for oil surrounding the shaft. There are three oil holes in each, so that one is always on the upper side ready to be filled. It is rather amusing to note the way in which an inexperienced oiler will sometimes take out one plug and pour in oil, replace the plug and turn the pulley so as to fill each of the others in succession, although all three open into the same chamber.

Fig. 6 represents a device, located in an engine room, for operating a friction clutch on the jack shaft outside of the room where it cannot be seen by the engineer. A wire cable about one-half inch in diameter passes over two carrier pulleys *2* and *3*. It is still further held in place by a pulley *4* near the floor.

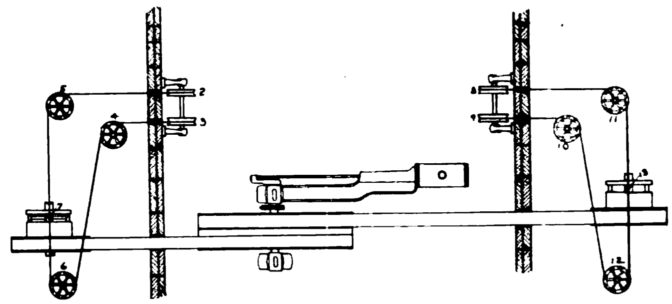


Fig. 7

Drawing down on one part of this cable throws the clutch in, and the same operation on the other side throws it out. This action will be better understood by studying Fig. 7, which is a plan of the engine, belts, clutch pulleys and cables for operating them. The pulleys *2* and *3*, Fig. 6, are also shown at *2* and *3*, Fig. 7. The cable passes around *4* and *5*, also *6*, and is fastened to the clutch lever at *7*.

The illustration shows two belts and two clutches, therefore the pulleys *2* and *3*, Fig. 6, also represent *8* and *9*, Fig. 7, and after passing over these the cable is supported by *10*, *11* and *12*. It is also fastened to the clutch lever at *13*. This enables the engineer to stop either one of the jack shafts at pleasure, for if a belt is wound around a shaft and is threshing itself to pieces and endangering other property, and perhaps will kill somebody if allowed to continue, then it becomes convenient to pull out the clutch on that side and stop the whole line of shafting without interfering with machinery in the other part of the shop.

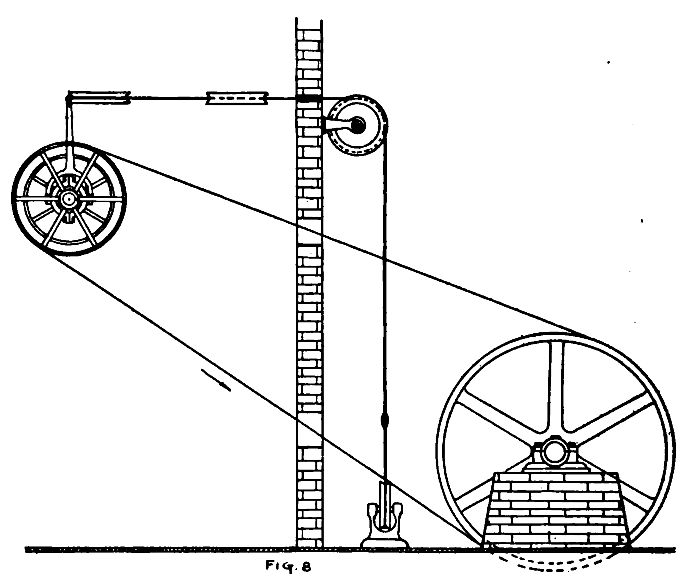


Fig. 8

Fig. 8 is a side elevation of one of the clutches in Fig. 7, showing that the engineer can watch the speed of the belt while preparing to pull in this clutch, and this helps him about determining the rate at which the load is picked up.

The other belt, which is not shown, leads off in the opposite direction, therefore while the lowest side of this belt carries the load, as indicated by the arrow, the upper side of the other performs the same duty. In this case both pulleys on jack shafts are of generous diameter, therefore the transmission of power is not rendered uncertain by small deficiencies. Both of these belts are kept tight as they run through small slots in the wall, hence if slack they would rub on the wooden frames.

The inertia of the shafting, belts and countershafts in this shop is greater than in the case mentioned in Chapter I, hence it is dangerous to pull in one of these clutches quickly when the engine is running full speed. My reason for this statement is, that a careless engineer did this on one occasion, and the belt was torn in two by the sudden strain thrown upon it.

This experience taught him to be more cautious, and now the engine is run slowly when a clutch is to be thrown in. If it was possible to see the clutch it could be worked to better advantage, but as before mentioned it is not in sight from the position occupied by the engineer when pulling it in, therefore he will usually make it pick up the load suddenly. If the engine is running slowly this can do no harm, for as soon as the clutch begins to "take hold" the speed of engine will be slackened. If it is running very slowly and the friction load is heavy it may stop the engine on one of its centers, causing delay in getting it started again.

It may be well to explain what I mean by "running an engine very slowly," as otherwise it may not be understood, for the term has a broad meaning. For the purpose of illustrating this point, I have tried to run one of my engines as slowly as possible with the following results: Starting from a dead stop, and opening the throttle valve just enough to start the engine, it will run four and one-half revolutions per minute. The throttle valve was not opened enough to give a heavy charge of steam and then partly closed, but after it was once started from its seat the wheel was not turned in the opposite direction until the experiment was completed. The diameter of this cylinder is fourteen inches and its stroke three feet. If any reader makes a similar experiment for the purpose of comparing results, the exact conditions must be noted.

Nearly every engineer gets his engine "on the center" sooner or later, and in many plants there is no convenient way provided for turning it off. In this case the engineer can throw off all of the load except the engine and two loose pulleys, making it possible to turn the wheel comparatively easy.

On small engines a monkey wrench may be put on the rim of fly wheel, to provide a good place to get hold of it, and on larger specimens a forged wrench six or eight feet long may be fitted to the wheel, thus greatly increasing the available leverage, enabling one man to turn an ordinary wheel, if the friction load is not excessive.

The only disadvantage that I have found in the use of clutches is that frequent use of them causes some of their parts to wear and if not readjusted promptly the pulley will slip, making it necessary to shut down and attend to the matter at once.

I have operated a belt driven by dynamo for nearly ten years, for use during parts of the day and evening. The only interruption of the service was one evening for just five minutes, caused by a clutch slipping. Of course this clutch has been adjusted several times since, but it has always been done just before it began to slip, and this plan is earnestly recommended to readers. Due attention to this will show that as soon as a clutch is adjusted to hold for its full capacity, it is not thrown in easily, but requires an effort. As the parts wear, less strength is required to pull it in, and when it goes quite easily, then it should be adjusted without delay.

Whether a clutch can be adjusted while the engine is running or not, depends on conditions. In Fig. 5 the driving shaft is shown at *2*, therefore it is impossible to adjust the clutch when this shaft is in motion. In Fig. 8 the adjustment can be made while the engine is running, because the loose pulley only will then be in motion, leaving the jack shaft, to which the hub is keyed, at rest.

This may not apply to some clutches in use, but it does to these. However, it is a poor plan to do this when either part is in motion if it can possibly be avoided. Serious accidents have happened to men engaged in such dangerous work, leaving them maimed for life.

It is usually better to adjust a clutch while thrown in, because it is then practical to give all parts equal tension. In many of these clutches there are four points to be adjusted, and if screws or nuts at one of these are thrown out farther than the others, it throws the whole load on a part of the mechanism, when it should be distributed evenly over the whole.

Of course it is possible to make adjustments with the lever thrown out, and the writer has done it many times. By throwing the lever in and out it is possible to tell whether it is too tight, too loose or just right, but that does not tell whether all four parts of the expanding device are extended alike or not.

A short time ago I saw a dynamo that furnished very poor incandescent lights, because the voltage varied badly and the cause was not plain to the man in charge. It was driven by a clutch pulley that was slipping under a rather heavy load that was put on during the last two hours of the day. Somebody resolved to adjust that clutch the next noon, but it was not done, consequently when the heavy load went on that afternoon the usual voltage could not be maintained as well as on the previous afternoon, making it necessary to shut down and adjust the clutch while the shop hands waited for light. In this case fair warning was given but not heeded, hence the penalty followed in the form of a comparatively expensive delay.

SAVING TIME IN THE DRAFTING ROOM.

BY F. W. SALMON, C. E.

The man who sits on a high stool before a big table and looks serious a number of hours a day, and very often sharpens his pencil, is not always the man who gets out the most drawings or the best. This was very forcibly impressed on the writer's mind some time ago where there were several changes in the office force, and amongst the new-comers there was one man who told us all of his long and varied experience in every line of work which, as the writer remembers correctly, included air ships and various devices in the use of radium, and of course all such common things as battle ships, dynamos, electric travelling cranes, blast furnaces, gas engines and racing yachts had been constructed in various parts of the world for all the great millionaires, by this young man whose beard was quite short.

Of course we learned the history of this young man by degrees, but we were all very much impressed by the very complete kit of tools that he carried, which was certainly very attractive and seemed to cover about everything that a man could expect to use in a drafting room, and as chance would have it, this young man was put on the same table beside the middle-aged man who did not seem to have anything, and who was continually borrowing everything (except a two-foot rule) from his neighbors. Nevertheless the man without the tools was busy all the time and did get the drawings and tracings made.

Now, the particular incident that I think will prove interesting to the reader happened shortly after dinner, before the engineer had returned, the chief draftsman having come in, looked around very seriously and seeing that everybody was busy left the office, when our young friend with the large box of tools started out to borrow an oil can to oil the small screws on his bow-pen-compasses, which he had said had got dry and were sticking. He had been doing more or less cussing all the forenoon about the "bum-office, without an oil can," and so he went around from one to another telling us all what a beautiful silver-plated bicycle oil can had been given him in some town, the name of which I don't remember, which he always carried with him full of a special grade of watch oil, but which he had not thought to bring down to this office, and that he just wanted to borrow ours for a few minutes. Now, the chief draftsman always scolds everybody unmercifully that produces a tracing in which the lines appear to have been made on greasy cloth, so we are all desperately afraid of everything greasy, and for that reason used to wear high white collars and long white cuffs, and keep a long way from everything that looked like machinery, so nobody had an oil can, and our young friend with the large number of small tools commenced his second pilgrimage around the office, telling every one of us what a miserable, poor, shiftless, worthless, good-for-nothing, bad, bad, bum-office ours was, because it did not have an oil can. After this had been gone through with, our friend without any tools called the other man over and asked him what was the matter, and what he wanted, and after receiving the explanation he told him he would fix his instruments, so our young friend seemed to at once jump to the conclusion that he would now get repaid for all the lending that he had done. So taking all the small tools over to the other man, he watched him rub the point of a soft black lead pencil on the screw of each instrument and then run it back and forth, when it appeared to be better lubricated than it would have been with oil, and since that time we have always taught the new-comers to rub a soft pencil on the screws of their instruments with very satisfactory results.

—*The Canadian Engineer.*

DIXON'S SCHOOL MATERIAL EXHIBIT.

At the recent convention of the Co-operative Educational Commission held at Lynchburg, Va., there were present about five hundred educators from the entire state. During the convention the Joseph Dixon Crucible Company had in a room in the Hotel Carroll an interesting exhibit of drawings and drawing materials, designed to show what may be accomplished with Dixon's pencils and crayons. A number of beautiful examples of pencil and crayon work had been borrowed from the public schools of Boston and Brooklyn. The visiting teachers came in large numbers to inspect and compare the work, and received from William A. Houston and W. A. Hart samples of drawing materials gratis. These two gentlemen had charge of the exhibit. The former, Mr. Houston, looks after the Dixon business in Maryland, Virginia and West Virginia with an office in Baltimore. Mr. Hart is the representative of the company in Richmond. In the same room the J. P. Bell Company, wholesale and retail stationers of Lynchburg, had an exhibit of interest to educators. It was in charge of H. P. Rhodes.

—*Walden's Stationer and Printer.*

GRAPHITE REMINISCENCES.

Gaskets, Screw Threads, and Hot Bearings.

BY LEWIS F. LYNE.

In the year 1883, while superintendent of an electric light station, I had a few joints blown out of the flanges between the safety valves on the boiler as well as out of the flanges in the steam pipes, and I hit upon a substitute for the treacherous sheet rubber packings then in use. I procured the regular asbestos board, 1/16" thick, and laid on with a paint brush all the boiled linseed oil that the asbestos would absorb, until it was made perfectly waterproof. After that it was dried and when a gasket was required it was cut out of this prepared asbestos board and thoroughly rubbed on both sides with graphite, mixed with boiled linseed oil. This made a most excellent joint that was almost as durable as the pipe itself, and I never knew one of these joints to blow out. There is now on the market a woven asbestos cloth, graphited one side and waterproofed, which works very well.

Some of my friends made steam joints by putting in the asbestos board wet, arguing that the dampness would cause the joint to rust, forming a "rust joint," but they did not last, for as soon as they were wet by condensed steam, the asbestos formed a pulp and blew out. It soon became apparent that the asbestos must be made waterproof, and then, to prevent rusting and to keep the faces of the joints in their original condition, the graphite was used.

We always kept a pot of graphite mixed with boiled linseed oil in the engine room, and used it on pipe joints, on the flanges, upon the threads of pipe fittings, and unions. It was also daubed on the threads of cylinder head and steam-chest

studs, and upon the threads of the stuffing boxes, on globe-valve stems and their stuffing-box nuts and studs. We smeared the bolts of water-pipe flanges and painted the pipes themselves, outside and inside, to keep them from rusting. Dixon's Pipe Joint Compound is largely the result of these early experiments and trials.

I may say in this connection that Dixon's Silica-Graphite Paint is better for painting the inside and outside of water pipes, because it resists the corrosive effects of dilute sulphuric acid. It pays to paint iron water pipe both inside and outside with a non-poisonous paint like Dixon's Silica-Graphite Paint. It requires a little time to do this satisfactorily, as this takes longer to dry than ordinary paint, but it pays to do it.

We always kept two cans of graphite mixed in our engine room. One was the mixture with boiled linseed oil, and the other contained graphite mixed with engine oil. With the latter we swabbed the piston rod and valve stems, using it also as an emergency preparation in case of hot bearings. Many a time have I taken a dynamo machine with the bearing on the pulley-end squealing like a "stuck pig" and just ready to stick fast, and by a liberal dosing of graphite and oil kept the surfaces from abrading and cooled them down without stopping or putting the lights out.

Those were "days that tried men's souls," when the proper proportioning of bearings to carry the load upon dynamos was not as fully understood as it is now. Almost all builders then made the bearings upon both ends of the shaft of equal size and without taking into consideration that the pulley end of the shaft had to carry almost all the load. Now he knows better.

CONGRESSIONAL LIBRARY CONTAINS 1,344,618 BOOKS.

The Library of Congress now contains 1,344,618 books, 410,352 pieces of music, 183,724 prints, and 82,744 maps and charts, according to the annual report of the librarian, Herbert Putnam, just presented to Congress.

The library gained 68,951 books, and about 50,000 pictures and pieces of music during the last year. There were bought 22,998 books, 16,348 were received by gift, 11,763 by copyright, and 6,474 gained by exchange with foreign governments.—*The Journalist.*

BESSEMER AND THE ENGLISH PENCIL INDUSTRY.

One of Bessemer's earliest commercial ventures, mentioned by Captain Hunt, seems to have been in connection with the manufacture of plumbago or black-lead drawing pencils. Great Britain depended until some time after 1831 for its supply of plumbago, suitable for such pencils, upon a single mine located in Cumberland. This was of immense value to its fortunate owners, and was closely guarded and its production limited. It was operated for but a short time each year, when about 40,000 pounds were taken out; then the mine was again tightly sealed. This plumbago was bought principally by a Jewish syndicate for 40 shillings a pound, and by them manufactured into pencils. We are told that this ring was dependent upon an inner one—the actual cutters of the plumbago—who with great skill, and with a waste of 60 per cent. and for about 20 shillings a pound, sawed the brittle material into thin sticks. The waste realized only about half a crown a pound, and the prepared sticks, when ready for the cedar wood cases, were sold at over 80 shillings a pound. There were no lead pencils with rubber-tipped ends for a penny a piece in those days. Young Bessemer seized upon the opportunity. He built a powerful hydraulic press, and bought up all the refuse and waste plumbago he could find, at about half a crown a pound. In fact, he bought up all the available supply in Great Britain. This he ground, lixiviated, mixed with a proper binding material, and by his powerful hydraulic press formed into compact slabs which were subsequently cut with fine saws into proper sized sticks that were equally as good, if not better, than those made direct from the ore. He could undersell, and so controlled the market.—*Cassier's Magazine.*

THE great heat-resisting nature of graphite (plumbago) makes possible the various forms of graphite crucibles with which Joseph Dixon in 1827 revolutionized the melting of metals.

Its resistance to acids, alkalis, pressure and high electrical conductivity make possible the great number of widely used articles set forth in our catalogue, copy of which we shall gladly send to anyone interested.

"MOONLIGHT BILL."

"Moonlight Bill" was the sobriquet
They gave him on the "Q,"
As by this name he is known to fame
It will do as well for you.

Now, William sat on the right-hand perch
Of the cab of "Ninety-Nine,"
And little cared how much was dared,
Provided he checked "on time."

"Ninety-Nine" was a "rare old girl,"
With steam and speed to spare;
Put Bill on the seat with a record to beat
The iron she'd skim like a hare.

One stormy night, in the wintertime,
In the year One-Nine-Naught-One,
There was "hell to pay" on the right of way
When the storm its work had done.

In consequence our Bill was late
And his heart was filled with woe,
So the throttle went till the metal bent
To a notch in the lowest row.

His engine sprang like a frightened steed
And the miles behind them sped,
While Bill held tight and glued his sight
To the ice-clad steel ahead.

They rounded a curve and struck the "straight"
That far o'er the prairie lay,
When a headlight bright burst through the night
And seemed scarce a mile away.

Bill seized the reverse with a mutted curse
And used both sand and air,
Then held his breath and awaited death,
With a snatch of forgotten prayer.

The sparks flew high from the grinding wheels;
The fireman fell in a swoon;
It is hard to relate, but the truth I state,
It was naught but the rising moon.

And now when the moonbeams lightly fall
And silver the round-house floor,
Our Bill is sad and his temper bad—
He has seen such things before.

—CHARLES A. MAYBURY, in *Sunset*.

ODD FACTS ABOUT COLOR.

The New York *Journal* asks if you have ever noticed there is no blue food. We eat things green, red, yellow, and violet; flesh, fish or plants in all the colors of the rainbow, except blue.

Many deadly poisons are blue in color, such as bluestone or the deadly Nightshade flower. Blue stands in our slang for everything miserable and depressing.

But this, the *Journal* says, is only one of a thousand queer facts about colors.

Cedar Vale, Chautauqua Co., Kans.

Pencil came. As good as the best if not better. I like it as I do all the Dixon goods. Z. E. WYANT.

Graphite.

VOL. VIII. MARCH, 1906. No. 3.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

LUBRICATION IN TEXTILE MILLS.

One of the recent publications put out by the Joseph Dixon Crucible Co., of Jersey City, New Jersey, is a neatly illustrated booklet of more than fifty pages that treats of the manifold usefulness of graphite as a lubricant. The following treatise is reprinted from that book:

There are some important considerations in this class of machinery that offer peculiar problems in lubrication and strongly emphasize the ordinary aspects.

Lubricating oil stains upon woven goods are almost impossible to remove without damage to the fabrics, and especially is this true of mineral oils. Animal and vegetable oils have certain disadvantages, as noted before, of gumming or decomposing and cannot, therefore, be freely used.

The consumption of power of a textile mill is not a case of a comparatively few machines, but of many thousand small spindles, great lengths of shafting, many looms, etc. The unit of fraction may be small, but it occurs thousands of times, and the cost of power (where water power is not available) is a heavy fixed expense that must be reduced to the lowest possible figures.

Another very important consideration is the very great number of employees, tending the spinning and knitting machinery, who are left absolutely idle if anything goes wrong to stop the engine. A hot pin or a cut bearing can very easily shut down a mill for an hour or two, perhaps longer, and the actual money lost to the owners be many hundreds of dollars.

It is likewise important that wear of spindles, looms and machinery be made as low as possible, if uniformly good work is to be turned out, and all bearings be kept from overheating. More than one textile mill fire has been traced to the overheating of a bearing, causing ignition of the oil which should have lubricated it.

The general principles which command the use of pure flake graphite applies with especial force in the lubrication of textile machinery. Occasionally introduced, it will glaze the small friction surface of each spindle, lowering their friction, keeping them cool, and preventing wear. In this instance it conspicuously aids the regular lubricating oil.

All bearings that are not siphon fed may be regularly treated to a little flake graphite with marked benefit in the shape of lower friction, less wear, and the impossibility of abrason and overheating.

If flake graphite be used, less oil will suffice to give good results, and there will be a corresponding decrease in the likelihood of a pulley or gear to "sling oil" and stain a fabric. Pure flake graphite cannot stain even a delicate fabric, and in lace mills often entirely displaces oil at points where an oil stain would be ruinous.

The use of flake graphite upon an engine's bearing is an absolute guarantee against any serious heating of the parts. It is a well-known remedy for hot pins and journals and scored valves and cylinders, and, for the same reason, if used with regularity, will wholly prevent the possibility of a costly shut-down due to these too frequent mishaps.

—*Textile Excelsior.*

THE SEVEN AGES OF TRANSIT.

All the world's a car,
And all the men and women passengers;
They have their exits and their entrances.
And one man in his time pays many fares,
His trips being seven ages. At first the Infant,
Squirming, and howling in his neighbor's ear.
Then the Schoolboy kneeling upon the seat
And looking from the window, while his shoes
Leave all their mud on some old lady's gown.
And then the Gallant, rising and giving up
His seat to some fair one; and then
The Business Man, full of strong oaths
At stoppages and delays; and then the Justice,
Needing much room to store his adipose,
Keeping behind the shadow of his paper
While maids and matrons wither him with stares;
And so he goes his way. The sixth age shifts
Into the fat and purple personage,
Hailing the car, and filled with helpless rage
When the proud motorman goes whizzing by
And leaves him cursing there. Last trip of all
That ends this rapid transit history,
Huddled he sits up in the corner seat
Until commanded, "Take the car ahead."

—R. L. SALE, *in New York Sun.*

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* **JOHN A. WALKER,** *Vice Pres. and Treas.* **GEO. E. LONG,** *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., March, 1906.

DIXON'S FLAKE GRAPHITE FOR ROCK DRILLS.

An interesting suggestion comes from the Superintendent of a very prominent maker of Rock Drills and Mining Machinery. It will certainly prove of interest, and perhaps of value to mining men. Our correspondent writes as follows:

"Some years ago we made some experiments in the way of lubricating, with Dixon's Graphite, rock drills operated by compressed air, in free-milling gold mines where oil possesses the great disadvantage that, when it comes in contact with any particles of gold, the metal cannot be held by the amalgam and is consequently lost. This is a line that might be developed with profit to the gold miners, the rock drill manufacturers, and yourselves, but experimental work should be carried on at the mines where the drills are operated, instead of in a shop hundreds of miles away from the field of operations.

"In regard to lubricating rock drills operated by steam, I consider that Dixon's Graphite is the most excellent lubricant. We never start a drill without its use, but in the quarries and rock cuts, where these drills are used, is the place where the lubricant must be introduced, * * * where a progressive mechanic in charge appreciates the advantages of graphite used in connection with oil."

If you would be interested to investigate graphite lubrication for rock drills, for air compressors, for gas and steam engines, graphite for pipe fitting and for the lubrication and preservation of wire ropes, etc., please let us hear from you. We have some interesting literature that will appeal to mining men.

Dixon booklets and samples are always free upon request.

A NUESTROS AMIGOS ESPANOLES.

Las estipulaciones del GRAFITO en Cuba, Puerto Rico, Sur América y Mejico, aumentan constantemente, pero los lectores en inglés en aquellos paises, que nos han expresado la satisfacción de haber recibido circulares y muestras de Grafito, han tenido la bondad de decirnos que no han podido darle la amplitud que tendría, por ser difícil a los lectores españoles entender la mejor manera de aplicar este lubricante á motores y maquinarias.

También nos han dicho que los Superintendentes é ingenieros de aquellos paises, leen solamente la lengua española y verían con gusto que les enviásemos de cuando en cuando algunos de nuestras instrucciones en aquel idioma.

Trataremos de satisfacer los deseos de nuestros amigos españoles y mientras tanto tenemos el placer de notificarles que nos será grato sostener correspondencia con cualquiera que lo solicite y responder en ese idioma á todas las consultas que nos hagan.

BIG, AIN'T IT?

It is officially stated that the new business of the United States Steel Corporation continues to come in at a rate considerably in excess of production. This seems to indicate that the unfilled business on the books of the steel corporation is larger than it has been at any time in its history. Several weeks ago it was stated that unfilled tonnage was in the neighborhood of 7,300,000 tons. The tonnage from all appearances is now running between 7,500,000 and 8,000,000. The United States Steel Corporation is now turning out about 35,000 tons of finished and semi-finished steel a day. In order to supply its customers it is buying all the available pig iron it can find in the market. The steel corporation could keep its mills in operation for at least nine months even if another new order was not received within that period.—*N. Y. Tribune.*

Think of turning out 35,000 tons per day—this is 70,000,000 pounds a day. Do you "catch on?" Seventy million pounds a day; seven million pounds per working hour; one hundred and seventeen thousand pounds a minute, or two thousand pounds each working second of the working day. Think, also, of having business on the books for nine months ahead.—JOHN A. WALKER.

DIXON'S graphite publications sent free upon request.

BANKER E. F. C. YOUNG SEES PROSPERITY AHEAD.

Business of 1906, He Says, Will Surpass all Previous Records in This Country.

The year 1905, with all its prosperity—the greatest the people of this country have ever known—is going to be eclipsed by 1906. Banker E. F. C. Young, whose judgment on business and financial conditions is well known, made this prediction to-day.

"All the indications," said Mr. Young, "point to a year of unprecedented prosperity. The volume of business in 1906 will far exceed that of last year. The crops are large, manufacturing industries are prosperous and busy, real estate is booming, and the building trades are on the eve of tremendous activity.

"There will be more miles of railroad built this year than last, and the shipments on land and sea will surpass all previous records. The output from mines of all kinds will be greater than ever before.

"In the financial field the outlook is exceptionally bright. The banks, as a rule, are all making money, and every inducement is held out for legitimate investment and enterprise.

"I cannot discern a cloud anywhere in the commercial sky. The year 1906 will undoubtedly be the most prosperous the United States has ever known."

A year ago this time Mr. Young predicted unusal prosperity for 1905. The view he expresses now is even more optimistic than that which he voiced then.

Mr. E. F. C. Young is also the honored President of the Joseph Dixon Crucible Co. —*Evening Journal, Jersey City.*

E. F. C. YOUNG,

PRESIDENT, JOSEPH DIXON CRUCIBLE COMPANY AND THE FIRST NATIONAL BANK OF JERSEY CITY.

Seventy-one years old, January 25th.
He is complimented by his friends.
He has no use for Osler Philosophy.

Mr. E. F. C. Young, the highly esteemed and much loved President of the Joseph Dixon Crucible Company and the First National Bank of Jersey City, was seventy-one years old January 25th.

Mr. Young is hale and hearty and one of the busiest and most hard working men in Jersey City. On his birthday scores of business friends called on him to congratulate him on having reached the seventy-one mark in such good condition. Many messages and telegrams were received. To many of the young men who called to congratulate Mr. Young he said: "I never felt in better health in my life, I hope that all you young men will be as hearty as I am when you are seventy-one years old."

Mr. Young has always been one of the most kind and loving advisers of young men, and as an example to all young men none could be better. There is none of the Dr. Osler philosophy in Mr. Young's theory and practice of life. He says a man is never a day older than he feels and if he lives properly and conducts himself rightly he will probably feel in good condition every day. Mr. Young claims that good health and an unimpaired capacity for hard work go hand in hand and it usually depends upon the man himself whether he feels his age or not.

THE VALUE OF THE FLAKE FORM.

There is a vast and important difference between Pure Flake Graphite and common commercial "black-lead" or "plumbago." For all purposes of lubrication crystalline graphite in the thin flake form, rather than the amorphous or non-crystalline, is clearly indicated by both theory and practice. Flake Graphite has greater natural purity, far greater wearing qualities and endurance, and the thin flakes adhere far more tenaciously to metal surfaces. The Dixon Company's famous graphite mines near Ticonderoga, N. Y., yield the world's only supply of an absolutely uniform thin flake of high purity, free from all grit.

Dixon's Flake Graphite is prepared in two different degrees of fineness to suit different conditions and to satisfy the preference of engineers for a coarse or fine flake.

No. 1 is the standard or coarser flake.

No. 2 is the finer flake.

It is well to keep both kinds on hand but be careful, in ordering, to state whether No. 1 or No. 2 is desired.

Buy only in original packages, bearing the red label, trade mark and name of the Joseph Dixon Crucible Company.

Bennington, Vt.

I wish to say that after giving your 'Eterno' copying pencil No. 2050 a thorough trial, that I find it to be all that you claim for it and even more. In fact I think it is the best pencil of the kind and I have used several different makes of them.

R. C. BRISTOL,
Agent Met. Life Ins. Co.

THE FESTIVE DRUMMER.

"Troubles of the Traveling Man."

Consider now the Traveling Man,
That gay and festive blade,
Who goeth up and down the land
In sporty garb arrayed.
Who playeth havoc with the hearts
Of many country belles,
And stoppeth, like the prince he is,
At all the best hotels.

Now mark him as he sits him down
Outside the tavern-door,
And lighteth up his good cigar,
Which cost ten cents or more,
While with his comrades gathered round
He swappeth sundry lies,
Or at the village maidens fair
Doth smile, and wink his eyes.

And presently unto the bar
With chums he doth repair,
And many drinks that man doth take
To drive away dull care.
Now would not such a life of ease
Appeal to any one?
And would we all be traveling men?—
Nay, wait a bit, my son.

For in the morn ere dawn hath come
From bed ariseth he,
And dresseth in a chilly room
To catch the five-nought-three.
As breakfast is not ready yet
He getteth on the train
And fasting, rides to Green's Cross Roads,
Perhaps an hour or twain.

And there before the tavern stove
He warmeth up his legs,
And presently he sits him down
To ham and poached eggs.
But when to work he goeth forth
He finds to his amaze,
His customer hath gone to town
To stay there several days.

He rusheth back unto the inn
Prepared to get away,
And there with sinking heart he hears
The landlord calmly say:
"Was you a-going east, my friend?
Well, you are left all right,
There ain't no other train that way
Till 9.18 to-night."

So when at last the weary day
Hath dragged its leaden round,
Again the happy traveling man
Is at the station found,
And to him comes the porter gay
And cheerfully doth state:
"Just make yourself at home, old chap,
Your train is three hours late."

When on the morrow he awakes
Again his work to start,
He gets a letter from his house
Which cheereth up his heart:
"We note that your expense-account
Is running far too high.
We must have this curtailed at once
Or know the reason why."

Now if his overcoat's at home
The mercury doth drop,
But if he's clad in winter clothes
It hovers near the top.
And all the nicest days come when
He's traveling on trains,
But if he has ten miles to walk
It either snows or rains.

At length the weary trip is done
And he is home once more;
He sees his wife an hour or so
Then drops down to "the store."
And pleasant words like these he hears:
"What, Jimmie, home so soon?
Well, get your samples up in shape
To start to-morrow noon."

Ah, envy not the Traveling Man,
For though his job seems gay,
Despite his efforts, now and then
Some work will come his way.
And when to you it seems his lot
Is one of joy alone,
Remember that the drummer hath
Some troubles of his own.

—*New York Sun.*

DIXON'S No. 7774.

For Polishing Engine Fronts.

The master mechanic of a leading trunk line advises us that his company is using signal oil mixed with Dixon's Graphite No. 7774 for the fronts of their engines. The oil and graphite are mixed to the consistency of a thin paste and applied with a brush the same as paint. They use about one quart for the front of one engine. The master mechanic states that in his experience the material holds well and does not wash off. The material takes a fine polish which seems to be thoroughly water-proof. They claim that this material is more durable than any material they have ever used and presents the appearance of a highly polished stove.

The conditions of this road are very severe, as their engines run through twenty-three tunnels and some large cuts.

They find that an engine treated as above will make four round trips, which means that they pass through ninety-two tunnels, over two hundred and twenty-four bridges, to say nothing of the immense cuts.

After an engine has been polished they often renew the polish by simply using a piece of old waste, and with it they rub off all of the old graphite that is possible and then apply a new coating. This keeps the surface free from lump and smooth.

GRAPHITE LUBRICATION FOR AIR PUMPS.

Air Pumps Need Better Lubrication.

The increased length, weight and speed of trains has put correspondingly greater duty upon the air pumps of locomotives to provide the requisite supply of compressed air, and pump troubles have increased uncomfortably of late years. Air pumps that used to operate quietly and smoothly with applications of cylinder oil at intervals, now, by reason of increased duty, demand close attention to their lubrication.

The railroad papers contain frequent mention of air pump troubles, complaints about laboring, overheating, squealing and groaning, worn and leaky packing rings and other manifestations of imperfect lubrication. There is a decided need of better lubrication for air pumps.

Graphite as a Lubricant for Air Pumps.

Dixon's Ticonderoga Flake Graphite cures nearly every lubrication trouble. It has cured thousands of badly working pumps in the past; its use is growing more and more popular every day.

For air pump lubrication, Dixon's Special Graphite No. 635 is particularly recommended, a special grade of Dixon's Ticonderoga Flake Graphite, derived by a selective process of refining and milled to an impalpable degree of fineness.

Some engineers feed No. 635 Graphite in a dry state by allowing the pumps to inhale it through the air inlets when working. We do not advise this method because air brake experts have stated that no lubricant—not even oil—should be fed to the pumps except through the regular oil cup.

The most satisfactory method and one highly approved by air brake men and locomotive engineers, is to mix a teaspoonful of graphite with a pint of the regular oil and introduce a little from time to time through the regular pump oil cup.

How Graphite Benefits an Air Pump.

This method soon results in coating and polishing the working surfaces of cylinder and piston with graphite, improving the fit while reducing friction in a great measure, preventing all binding and cutting. A freer, smoother action immediately results and all laboring, groaning and squealing ceases. The tendency to overheat is overcome and the efficiency and capacity of the air equipment increased to remarkable extent.

Oil need not be fed so frequently, pumps respond to all demands for more air, less trouble is experienced with worn and clogged valves, packing lasts far longer, repairs are required less often and locomotive efficiency and economy improved decidedly.

Dixon's graphite publications sent free upon request to all interested.

FACTS CONCERNING TICONDEROGA GRAPHITE.

By Joseph Hyde Pratt.

From U. S. Geological Survey for 1904, article, "Graphite:"

"Some of the Dixon Graphite from Ticonderoga, N. Y., has given as low as 0.24 of one per cent. ash.

"It has a greasy feel, is a good conductor of electricity, is impervious to atmospheric influences, is combustible only at very high temperatures, and is very soft. Hence, its usefulness as a lubricant.

"The final method of purification at Ticonderoga is a secret process.

"Graphite is divided into two classes, Crystalline and Amorphous.

"The Amorphous cannot be used for lubricants.

"The Ticonderoga stock is all Crystalline.

"In the making of lubricants, pencils, crucibles and electrical supplies pure graphite is essential."

LUBRICATION OF WIRE ROPES.

Question: Is it advisable to galvanize wire ropes subjected to constant bending around sheaves and drums?—*C. G. N.*

Answer: Such ropes are not usually so treated; but it is essential that they be kept well lubricated by the frequent application of oil, or some similar material, free from corrosive substances. A good waterproof graphite grease gives satisfactory results as a lubricator.—*Technical World.*

Dixon's Waterproof Graphite Grease is admittedly the best rope lubricant on the market.

Graphite as an ingredient of wire rope grease assures diminished wear and saves time, money, danger and trouble.

DIXON'S CRUCIBLE GUIDE.

A Booklet That Every User of Crucibles Should Possess and Carefully Read.

Do you know that special work requires special crucibles—or crucibles that vary to some degree in the materials used in construction?

Different furnaces and fires—coke, coal, air or gas, require crucibles specially made, else the best results are not obtained.

We have a little booklet which tells how crucibles are made and how to use them. It is written by our Vice President and General Manager, Mr. John A Walker, who, by his many years of experience in the manufacture of crucibles, and by his constant connection and correspondence with crucible users, is well fitted as an authority.

Every brass moulder or user of crucibles can have a copy of Mr. Walker's book, free and postpaid, by sending us his address.

TWELVE THINGS TO REMEMBER.

1. The value of time. 2. The success of perseverance. 3. The pleasure of working. 4. The dignity of simplicity. 5. The worth of character. 6. The power of kindness. 7. The influence of example. 8. The obligation of duty. 9. The wisdom of economy. 10. The virtue of patience. 11. The improvement of talent. 12. The joy of originating.

—Marshall Field.

BENJAMIN FRANKLIN.

We have just passed the two-hundredth birthday of this distinguished American.

He probably was the ablest man of his generation.

He was an all around man, winning pre-eminence in many different lines.

He became noted as a business man. He was a money maker and became rich when few succeeded in money making, and he made money at the same time and place where others failed.

He was an unusually clever writer; he interested his readers. When it was difficult to catch the public ear he caught it, and his writings were read everywhere.

He was far and away the most important statesman of the revolutionary period. He brought about what others said was impossible, he invariably made his point, accomplished his aim.

He also was distinguished as a diplomatist in a foreign land. He made a foreign court recognize his country, and did this work as he did his work in all other departments, with facility and great ease.

He was notable as a scientist, his prescient brain anticipated the modern successes in the electrical world.

His head was large, ample, a good brain box for the noble instrument it contained.

He was fresh, original, clever, never in a hurry, always at the front—inventive, originative, fond of all the newest things, and staying also in love with the old. He was eminently teachable, kept his mind everlastingly open to new thoughts. He saw where others were blind; he was awake when others were asleep. He was a great man.—JOHN A. WALKER.

THE MASTERY OF THE EARTH.

This is the title of an article by W. S. Harwood in the February *American*, Leslie's old monthly.

One notable picture is of a peach tree not sprayed to protect it against the "leaf curl" disease.

Another is the tree duly sprayed.

One is the bare trunk with scrawny leafless branches and no fruit, a barren peach skeleton; the other a noble trunk, branches hidden in abundant foliage and loaded with rich, luscious fruit.

What can be done with a tree can with change of system be done with a man and his job. The tree, however, is a dumb affair, and some one from outside must apply the remedy. Nature, however, insists that with the man the remedy shall be applied by himself.—JOHN A. WALKER.

THE DIXON PLANT,

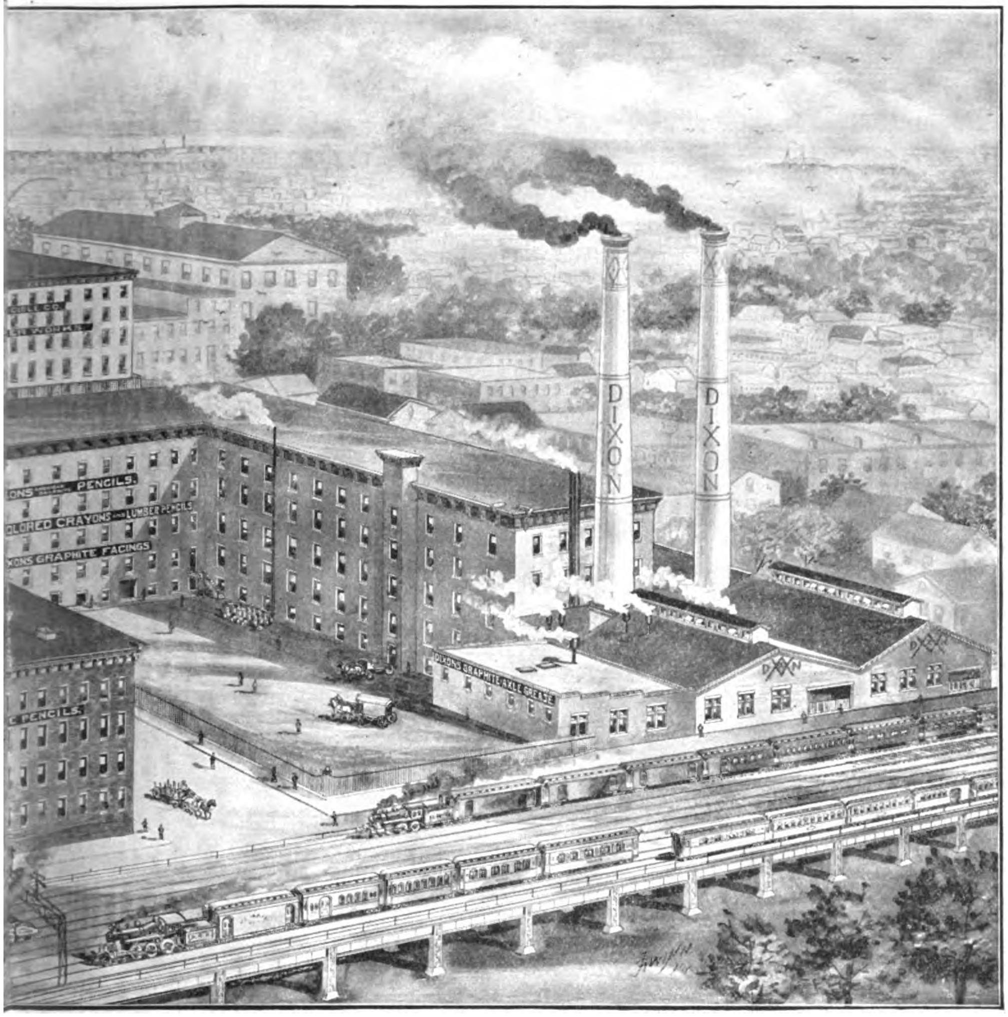
Although we showed on the editorial page of GRAPHITE for February a new cut of the Dixon plant, yet as it was a small one it probably was not specially noticed by our readers. We therefore in this issue of GRAPHITE show an illustration that tells its story in a larger way.

The four story building bearing the sign "Brass and Rubber Works" is a structure put up during the year 1905. It is, as shown, an L-shaped building, four stories high and runs one hundred feet north and south and one hundred feet east and west. In this building we manufacture the rubber tips for lead pencils, the rubber erasers and the brass tips which are used on lead pencils, as well as brass pencil cases and the other attachments for pencils which are so well and favorably known.

In this same building we have a large nickeling and guilding plant, in fact we take raw rubber and plain sheet brass and manufacture it from the very beginning into the above named articles.

The large plant at the left is utilized in the manufacture of Dixon's Graphite Lubricants, Dixon's Silica Graphite Paint, and in packing Dixon's Pure Ticonderoga Flake Lubricating Graphite.

The comparatively small building across the street is the Dixon office. Ordinarily speaking, this building is large enough for a fair sized factory, but now with its various departments of office work desks are getting so close together



JERSEY CITY, N. J.

that the company will need quite an additional extension at a very early date.

In the foreground is shown Dixon's Graphite Crucible Factory. In this building are manufactured Dixon's Plumbago Crucibles, which are used throughout the world; Dixon's Graphite Facings for foundry use and all of the various devices used in foundry and metallurgical work.

Back of this building is the pencil factory, facing the Dixon office.

At the right is shown a large L-shaped building in which are manufactured the various pencil leads used in lead pencils, also Dixon's various colored crayons, lumber pencils, etc., also graphite resistance rods and graphite brushes for the commutators of electric motors.

The Dixon power plant is located in the extreme right foreground, as shown by the presence of the two stacks. The right hand stack was erected during the summer of 1905, and is 150 feet high and 72 inches bore.

These stacks were erected by the Alphons Custodis Chimney Manufacturing Company of New York City. The stack at the left was the third stack of the kind put up in the United States, although there are thousands of similar stacks in use at the present time. The stack on the left has been in use for about six years, the right-hand stack was made necessary by the addition of two Babcock and Wilcox boilers of 500 horse-power each.

The low buildings at the foot of the hill, which are dimly shown in the background at the left of the stacks, are the stables and storage sheds of the Dixon Company.

Altogether the plant at the present time covers seventy city lots.

We are proud of the Dixon Plant, we are proud of the reputation throughout the world of the Dixon graphite products, we are proud of all the Dixon employees, we are proud of our more than three-score years of existence, and we are proud that we are getting bigger and stronger every day. There is no chloroform for the Dixon Company.

LUBRICANT FOR PIPE SCREW THREADS.

Under "Shop Kinks" *Railway Machinery*, for October, '05, prints the following contribution:

"The best "dope," so called in shop parlance, that I have ever seen used for making pipe connections, is composed of 1 pint of "black strap" machine oil, ½ pint graphite, ¼ pint of white lead, and a teaspoonful of flour emery. These proportions are not exact, but they are substantially what are used. The object of the flour emery is to polish the threads as they are being screwed together. The graphite, white lead and oil make a fine lubricating mixture, which has enough consistency to stop incipient leaks. I have seen many large pipe radiators made up using this mixture, and they never leaked a drop when the steam was turned on."

The advantage of *lubricating* over *cementing* pipe threads is a great one, not only to enable the joint to be made up tightly but, if graphite be the lubricant employed, to allow the parts to be unscrewed when changes or repairs are necessary.

The machinist or pipe fitter will find Dixon's Graphite Pipe Joint Compound rather better than the above receipt, beside saving the trouble of preparing the mixture. Samples are free to all who wish to try it.

BERESFORD IS SEVERE.

"MALTA, Sept. 6.—Lord Charles Beresford, commanding the British Mediterranean fleet, has created a sensation in the fleet by ordering the prosecution of an engineer commander for allowing the bearings of machinery of his vessel to become hot. This is a new offense in naval court martial."

The above item is from the columns of a daily paper. While it may be a new offense in naval court martial, yet it should be considered an offense no matter where it occurs.

With bearings, shafts and journals properly alined, and not heavily overloaded, there is no need of hot bearings—provided suitable lubricants are used.

In the matter of lubricants and better lubrication we have a very interesting pamphlet which is sent free of charge to anyone interested.

THE PANAMA CANAL.

The following from the Jamaica, W. I., *Gleaner*, may be of interest to some of the readers of GRAPHITE:

"History has it that in 1528 Philip II. of Spain thought of building a canal across the Isthmus. Engineers reported it feasible at several points. In the promotion of the enterprise there resulted so much politics and scandal that the distracted monarch regretted his inspiration and "ordered that no one should revive the subject or make any proposition concerning it, under penalty of death."

"Nearly four hundred years later the same thought has come to a President of the United States, who in time may be forced into Philip's frame of mind and desire to include in his edict all who encouraged him to its fulfilment. The route has been selected and the work begun, but politics in the zone and troubles at home would indicate a tendency on the part of Philip's conclusion to repeat itself."

OVERHEATED BEARINGS.

Made to Run Smoothly by Means of Flake Graphite.

When the main bearings and big end of the connecting rod brasses have been running some time, it is generally necessary to take up the wear and re-scrape the brasses. When this has been done it is sometimes found upon starting up the engine that there is a tendency to overheat the bearings, to avoid which liberal supplies of oil must be given. It will be found that if after scraping in the brass, and before putting on lubricating oil, all of the wearing surfaces are well rubbed with flake graphite, they will run much smoother and will not have the same tendency to heat up. When examined under a microscope the brasses appear to be porous, and entirely composed of more or less sharp crystals. The effect of the graphite appears to be that the pores are filled up with this unctuous material and a smooth surface formed, friction thus being materially reduced.

—*Automobile Magazine.*

DIXON'S GRAPHITE AIR BRAKE AND TRIPLE VALVE GREASE.

Dixon's Graphite Air Brake and Triple Valve Grease prevents all undesired quick action of the brakes.

It is absolutely warranted to be free from acids and other corrosive ingredients and will never under any circumstances dry, gum, ball-up or become hard when chilled.

It contains only the finest procurable oils combined with the smoothest, finest and purest grade of Dixon's Ticonderoga Flake Graphite, Dixon's Special Graphite No. 635.

Dixon's Graphite Air Brake and Triple Valve Grease assures the smoothest and most sensitive response of the triples to reductions of pressure under all conditions of weather, prevents undesired quick action of the brakes which often breaks car-couplings, saves the necessity of frequent inspection and lubrication of the valves, and meets with the unqualified approval of air brake experts.

Dixon's Graphite Air Brake and Triple Valve Grease provides for the lubrication of all parts of the air brake: engineer's brake valve, triple valves and brake cylinders and pistons.

Two or more greases are not needed for this work. Dixon's covers all requirements.

The value of Dixon's Pure Flake Graphite in the lubrication of triple valves has been thoroughly demonstrated by a long series of tests made by Prof. W. F. M. Goss, upon the air brake testing-rack of the American Master Car Builders' Association, located in the laboratories of Purdue University and embracing a full air brake equipment for two trains of fifty cars each.

In his report of these tests, Prof. Goss states that "the presence of graphite on the metal surfaces of the valves serves to improve this action in a marked degree," that "the action of the triples was more rapid and delicate than with vaseline alone prior to the use of graphite," and, furthermore, that they were "more responsive to the 'skipping tests' than shown in any previous record" of the A. M. C. B. air brake testing equipment.

Of our many testimonials the following will serve as a sample:

UTICA, N. Y., Nov. 18, '05.

Joseph Dixon Crucible Co., Jersey City, N. J.

GENTLEMEN:—I received your booklet "Air Brake Lubrication," and also the samples of Dixon's Special Graphite No. 635, and Dixon's Graphite Air Brake and Triple Valve Grease, and I want to say that you certainly have a good article in each one. On my engine I have a most troublesome brake valve which had to be cleaned and oiled twice a week or else it could not be moved with one hand. I applied a little of Dixon's Graphite Air Brake and Triple Valve Grease, and now the valve moves as smoothly as when it was first oiled, and that was three weeks ago. Your grease should certainly be a great saving for any railroad now using it, both in the time and labor of re-oiling and in the extra life of the valves.

I also tried Dixon's Special Graphite No. 635, and had most excellent results with it and saw a marked improvement with its action. With best wishes, believe me,

Very truly yours,

AN ENGINEER.

DIXON'S GRAPHITE AND THE SUPERHEATER.

Last year the Canadian Pacific Railway applied the Schmidt steam superheater to one of their locomotives and proceeded to carefully watch its performance. The engine was kept in very hard service during the whole of the terribly severe Canadian winter. The officials of the company are so well satisfied with the working of the superheater that an order has been given to put it upon eighty more engines. The only difficulty encountered with the superheater was the lubricating of the cylinders. A pump to inject ordinary cylinder oil mixed with Dixon's Graphite ended the lubricator difficulty.

—*Railway and Locomotive Engineering.*

Salem, Mass.

We can with pleasure endorse all you claim in your little booklet for the 'Eterno' pencil. We cannot see how a better pencil can be made for all-around work.

J. J. Connelly Company,
61 Boston Street.

UNIONS FOR STEAM PIPE LINES.

By W. H. Wakeman.

Chapter I.

Steam pipe lines of large and medium sizes are fitted with flange unions corresponding to the kind of pipe used, which must be adapted to the pressure carried, but for smaller sizes such as are used in every plant for conveying steam to different places, some kind of union is used that must be screwed on and taken off with a forged wrench of suitable size, or a monkey wrench that can be fitted accurately to any union in use (with reasonable limits.)

I have used the term "must be screwed on," etc., advisedly, although some steam fitters apparently do not believe it, as they use a Stillson or any similar pipe wrench that happens to be at hand, to tighten or loosen a union, whether it is made of iron or brass, regardless of the "trade mark" such wrenches always leave on the material. However, this does not really alter the case, as a smooth wrench of some kind must be used, provided good practice is followed.

The ordinary malleable iron union packed with a gasket cut from sheet packing is still extensively used, and preferred by some engineers, although it must be repacked occasionally. This is not a hard job, but many of these steam pipe lines are in almost constant use, therefore it is inconvenient to shut off steam long enough for the iron to be even partially cooled, and to clean the surfaces and put in a new gasket. Sometimes these all iron unions become rusted fast in place, making it difficult to unscrew the nut, but this may easily be prevented by covering the parts that are liable to rust with Dixon's fine graphite mixed with cylinder oil.

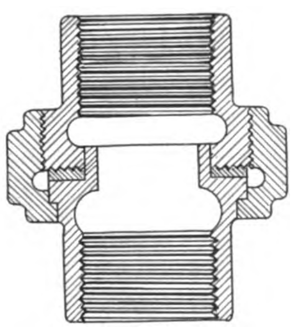


FIG 1

It is quite evident that these unions do not give general satisfaction, as there is such a variety of improved kinds, or at least they are supposed to be improvements, now in the market. Whether they are or not remains for the engineer who uses them to decide for his particular case. The common union can always be packed and made tight, although it takes a few minutes to do it. Some of the so-called improved unions last a little longer than a gasket in an all iron union, but when they do begin to leak they must be removed from the pipe and refitted in a lathe, which is both inconvenient and expensive.

The first improvement to be noted is illustrated in Fig. 1. The face of one-half of this union is corrugated and a metal gasket is supplied with it. As these corrugations are forced into the comparatively soft gasket they hold it firmly in place, therefore it cannot blow out under pressure. If it leakes after being taken apart and put together several times, a new gasket may be inserted, making a perfect joint at a small cost. If a metal gasket is not at hand, one may be made for temporary use out of thick sheet packing.

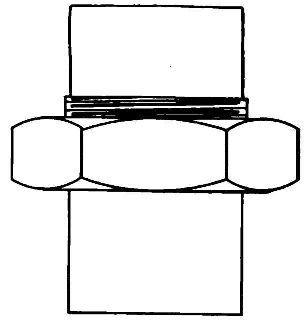


FIG. 2.

Fig. 2 is of about the same external shape as the preceding, but is made wholly of brass. The joint is of the ball and socket type, which will be tight even if the line of pipe is not perfectly straight. If a Stillson wrench is used to connect this union to a pipe line, it is ruined so far as external appearance is concerned, therefore a special wrench must be used to overcome this objection. This is made in the form of a smooth clamp that grips the round surface without cutting into it. A special size must be used for each varying diameter of union, as one that is right for a 2 inch, will not fit a 1½ inch union. As the two parts are ground together, a tight joint is made without packing.

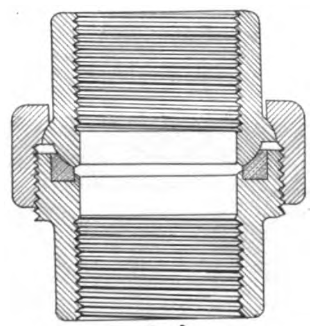


FIG. 3.

Fig. 3 illustrates a malleable iron union with an inserted seat made of bronze. As this is forced into place, it cannot drop out before it is put into service, nor when temporarily disconnected for any purpose. As the joint is accurately fitted, no packing is required and as it is composed of two very different metals, they will not easily corrode and rust together. The joint made by the nut on the male part is also well fitted so that it will not leak at this point, even if the bronze seat is damaged by use so that it is no longer tight.

As it is made of malleable iron and extra heavy, a Stillson or any simillar pipe wrench may be used on it without harm,

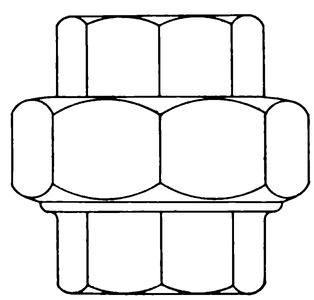


FIG 4.

but Fig. 4 illustrates the external appearance of the same general type of union, except that it is made in octagonal form, or "eight square," according to the term frequently used by steam fitters and engineers. This makes it possible to turn it with a monkey wrench without leaving marks on the surface, which is often very convenient.

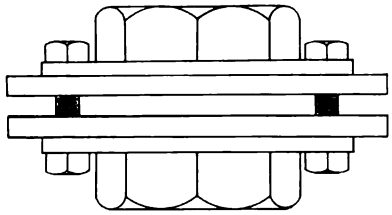


FIG. 5.

Fig. 5 is an external view of the same kind of a union, except that it is made to be held together with bolts instead of one large nut, or in other words, it is a "flange union." With an ordinary flange union requiring a full size gasket, the pipe must be in line or else the flanges will not come together properly and make a tight joint. This is right, as every pipe line should be put up in a workmanlike manner, but there are cases where it is not practical to bring two pieces of pipe into perfect allignment, and they may be located where they are very seldom seen. In such a case this flange union will be found useful, as the joint can be made tight even with a slight bend in the pipe, owing to the shape of the joint.

Both parts of this union can be "made up" with a monkey wrench, which is a novel feature for this kind of fitting.

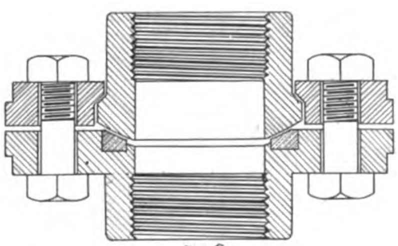


FIG. 6.

Fig. 6 is the same kind of a flange union, except that its external surface is round, making it necessary to use a pipe wrench. One very good feature is found in the fact that there is plenty of room to turn the nuts on a flat surface. As this is not so in every case, it will be appreciated by those who have struggled to turn nuts that rest on uneven surfaces, without sufficient room to clear the corners freely. These bolts may be put in from either direction, as the nuts can be turned easily on either surface.

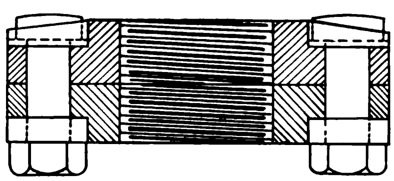


FIG. 7.

However, when the nuts become corroded and firmly rusted in place because the steam fitter failed to cover the bolts with Dixon's fine graphite mixed with cylinder oil before the nuts were put on, it becomes necessary to hold the square head of each with another wrench, when an attempt is made to remove them. If one or more of the bolts should be twisted off in the operation it would not cause surprise, but the above mentioned precaution will save much trouble along this line. Always use the fine graphite.

Fig. 7 is the elevation of a malleable iron flange union, both parts of which are faced to make a tight joint without packing. The flanges are heavily ribbed for two reasons, one of which is that such ribs add much to the strength of these flanges.

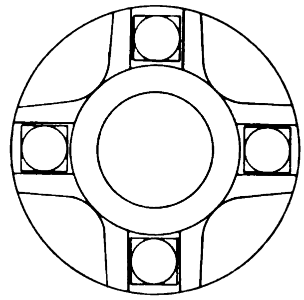


FIG. 8.

The other reason is on account of the heads and nuts of the bolts. Fig. 8 is a plan of the ribs on one flange, showing how the bolt heads are kept from turning, thus making it unnecessary to use two wrenches when removing them.

When bolts are new and the threads well oiled, they should not turn even if not held at all. If the nuts do bind, the bolts should be taken out and threads re-cut, so that all force applied to the wrench when screwing down a nut will act to compress the flanges (except what must necessarily be used to overcome friction) and make a tight joint.

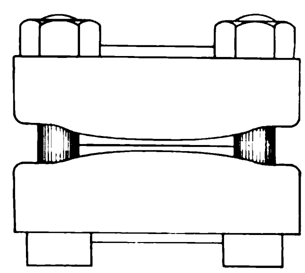


FIG. 9.

If much of this force is required to overcome excessive friction it is impossible to tell when the packing is properly clamped (if it is a packed union), or when the joint is made perfect if ground or faced joints are provided. Ribs on the other half act as raised surfaces, on which the nuts may be conveniently turned with little friction. This design makes it possible to reverse the bolts.

Fig. 9 is an extra heavy flange union, not particularly designed for steam pipe but for hydraulic work, where a working pressure of 800 pounds to the square inch is carried. They are tested and made tight at 5,000 pounds pressure.

Fig. 10 illustrates a malleable iron body into which bronze seats of spherical form are inserted. It is claimed that this union possesses all the advantages of a bronze or brass union, but is less expensive, as the body of it is made of cheaper metal. The seats are forced into place under pressure, and as the metal of which they are made expands more than the body when heat is applied, they are sure to be tight.

Fig. 11 is a union made entirely of malleable iron, except a brass packing ring that is not fastened to either half. It may

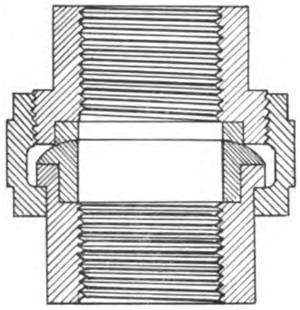


FIG 10.

be taken out while the iron parts are being screwed on the pipes and then put into place the same as a gasket made of sheet packing. This design makes it an easy matter to re-

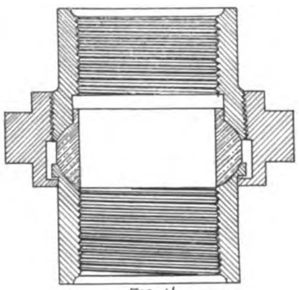


FIG 11.

place the brass washer or gasket, if it is accidentally damaged. Pressure caused by screwing on the nut is sufficient to make a tight joint without forcing the washer into place when the union is made.

Fig. 12 is a flange union constructed on the same principle, therefore it has the same advantages. It will be noted that in this case, also with some other flange unions, there is no place to put a pipe wrench unless it is on the outside of

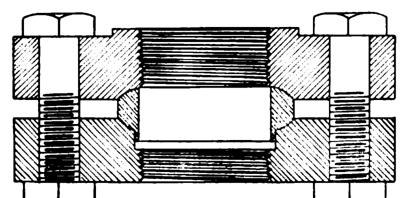


FIG 12

the flanges, which is impractical. These parts are screwed on the pipes by putting two bolts in opposite holes and inserting a bar between them, thus securing a heavy leverage. In this case the brass washer would interfere with free action, as danger of spoiling the ground joint becomes a factor to be reckoned with, but the ability to remove it easily until the flanges are screwed on securely, when it can be quickly replaced, overcomes this objection.

(*Concluded next month.*)

A PATENT CANDLE.

A man has invented a patent candle.

"A candle enveloped in a non-inflammable but vaporizable sheath, destructible by the flame of the candle, and extending from the base of the tip to the butt of the candle."

There is nothing like improvement even in so humble a thing as a tallow candle, and yet some of us remember the good old home-made "tallow tip" with its candle stick and the nearby snuffers. If the snuffers were mislaid how expert our grandad was with his thumb and finger!

A whole train of recollections come up with the memory of that old-fashioned tallow dip.

HOW JOBS ARE LOST.

It it always interesting, of course, to learn how young men and boys get jobs and hold them, and how they rise from lower to higher positions and increased pay. It ought to be equally interesting to learn how some employees lose their jobs. The *Chicago Tribune*, with this end in view, not long ago offered a weekly prize of $5 for the best explanation, by letter, of how a job is lost. There were eighty-one competitors, most of the letters containing frank confessions of the writers' shortcomings. The reasons assigned for discharge were as follows:

Drink	11
Loafed	9
Bad Company	7
Carousing unfitted them for duty	7
Swelled head	6
Business discontinued	4
Accused of gambling (one guilty)	4
Aspired to get higher jobs	4
Refused to run errand	3
To reduce expenses	3
Accused of drinking	3
Shirked work	2
Cigarettes	2
"Knockers" got busy	2
Because he wanted to learn English	1
Called on girl while on duty and lied about it	1
Because the beer froze	1
Thought business couldn't run without him	1
Gave the boss the wrong tip on a race	1
"Kidded" the boss	1
Cheated to keep up with heavy work	1
Didn't work unless specifically told to do something	1
Offered to box with priest	1
Wanted to marry boss's sister	1
Boss boorish to women clerks	1
Couldn't understand when owner dictated in broken English	1
Forty year old stenographer wanted to mary him	1
Manager's wife disliked him	1

As might have been expected, drink was the one single cause assigned for the largest number of discharges—eleven—although "carousing" that unfitted the carousers for duty was responsible for seven lost jobs. And it is to be noted also that only eight of the eighty-one who were "fired" blamed their employers for it.

Sample of 'Eterno' pencil received. It appears to be of a very high grade. I have not yet tried it in copying but find it writes smoothly and evenly.

Edwin L. Felsenthal.

A TEST OF GRAPHITE

In an Air Cooled Engine Cylinder.

A few days ago a gentleman connected with the mechanical department of a large concern manufacturing air cooled motors, called on us for a little talk on graphite. He had lately become very much interested in graphite as the result of the following experience:

In testing one of their twenty horse-power engines they found that while they got twenty brake horse-power at the beginning of the test this was soon reduced to fifteen or sixteen, but on the addition of a small amount of graphite to the lubricating oil the brake showed twenty-two horse-power. This higher efficiency was maintained for about twenty minutes after the supply of graphite was cut off, when there began a gradual reduction, which went on until only sixteen horse-power was delivered. The experiment was repeated several times with almost the same results. It is needless to add that these people are now working out the details of the application of graphite in the lubrication of their cylinders.

The advantages of air cooled over water cooled motors lie in the reduction of weight, and in the elimination of the circulating mechanism and of the heat absorbing material, water. These changes of course mean an increase in the efficiency of the machine, but this increase is a very small matter compared with what it would be if the cylinders were not cooled at all, or just enough to insure the integrity of the metals of which they are composed. But the problem of lubrication is the thing which stands in the way. In such high temperatures oil is either entirely volatilized or charred and is as bad or worse than no lubricant at all. For this and for so many other lubrication difficulties, graphite seems to offer the solution. Graphite neither chars nor volatilizes, but under all circumstances persists in doing its lubricating duty. The broad flat flakes stick and stay and prevent metallic contact. The presence of the graphite reduces the abrasive action of the charred oil to a remarkable extent. The uses of graphite in the automobile field are growing immensely, but no more than its merit as a lubricant warrants.

GRAPHITE FOR LUBRICATION.

Norfolk, Va.—Editor THE MOTOR WAY.—Is graphite suitable as a lubrication for change-speed gears? Some of my acquaintances highly recommend it, claiming to have secured excellent results with it, while others contend that a proper grease alone is sufficient. Are there any other parts of a motor car's mechanism where the use of graphite might be advantageous?—G. H. T.

Graphite is in many respects one of the most superior lubricants known, and its use, usually mixed with oil or grease, is strongly to be commended. In a change-speed gear box, a grease containing it not only will make for smooth running, but will last longer than will the same grease without graphite. In gasoline engine cylinders, graphite containing oils are particularly useful, because of the great heat-resisting qualities of this mineral. About the only use of graphite that is to be avoided by the motorist is its introduction into the pipes of gravity-feed lubricating systems. Here it is likely to settle out of the oil and clog the pipes.—*Motor Way.*

Graphite.

VOL. VIII. APRIL, 1906. No. 4.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

A REMARKABLE MAN.

Whose Life and Accomplishments Should be a Lesson to Those who Are Getting That Old and Tired Feeling.

If you have done all that your opportunities and circumstances permitted you to do, that is all right, but if you feel now that you are too old in years to accomplish many things that you might have done and did not do, consider that there is here, in New York City, a man born in 1809, who is still in active business in that city.

In 1832 that man built the first practical steam yacht.

That man built the first steam warship for the United States.

That man was the first Chief Engineer and Engineer-in-Chief for the United States Navy.

That man in pursuance of his profession has designed and superintended the construction of warships and other vessels, the foundations of buildings and bridges, etc., and has held many public offices.

That man in 1898, at the age of 89 years, was appointed by the Board of Public Improvements of New York, to design and direct the extension of Riker's Island, Long Island Sound.

In 1902, when he was 93 years of age, that man was appointed Consulting Engineer to the Board of Estimates and Apportionment of the City of New York, which office he still holds. Although more than ninety-six years of age, he never misses a day at his office, and is particular about giving the city all the time it requires in return for the salary he receives.

That man is Charles Haynes Haswell, the oldest engineer in the world in active practice. He is a member of the leading engineering societies. He is the author and publisher of Haswell's Engineers' and Mechanics' Pocket Book, which so far as we know, was the first publication containing any considerable amount of engineering information. That book is now in its 69th edition. He is also the author of several other works.

What an example this man is to those who feel because they are forty, or fifty or even sixty years of age, that they are getting too old to work or to take up new lines of work or thought.

For the above information we are indebted to the *Scientific American.*

SPECIAL PROCESS OF MAKING LINSEED OIL.

In some of the advertisements put out by manufacturers of graphite paints we notice that a claim is made of a "special process of making linseed oil." As the Dixon Company has always endeavored to use the very best linseed oil obtainable without regard to cost, and an oil absolutely free of any adulteration, we have been much interested in these advertisements of a "special process of making linseed oil." We have taken up the matter, not only with the heads of the oil companies, but also with members of the "Committee on Preservative Coatings appointed from the American Society of Testing Materials." The members of this Committee are scientific paint men, chemists and experts on oils and pigments. We have been advised that all such claims are "simply good commercial twaddle,—stuff that sounds well but means nothing. That is to say, nothing more than could be said by any first class manufacturer of linseed oil." Such a manufacturer is just as careful in straining his materials, in seasoning the oils, etc., as he can be, because he knows that the paint maker by a very simple test can tell when he has not been careful. Every manufacturer is in a position to get good linseed oil and the Dixon Company do not only purchase the very best oil obtainable but they use it in the manufacture of their graphite paints without the addition of anything in the way of an adulterant.

Dixon's Silica-Graphite Paint is what we have always claimed it to be, a silica-graphite paint made of the best silica, flake graphite and the best fire boiled linseed oil. Whenever a chemist has analyzed the Dixon Silica-Graphite Paint bought in the open market in unbroken packages, or bought from us direct, he has always found it exactly what we have claimed it to be.

"PERSONAL AND PRIVATE."

The chief engineer of a large and well known plant, in a letter to one of the Dixon salesmen who had visited him, says, "I have had several people try and talk me out of using Dixon's Graphite in my gas engine cylinder, but I say 'nit.'"

In conversation with the Dixon salesman, the same engineer said that if he had to give up either oil or graphite for the cylinders of the gas engines, he would give up the use of oil. "But" he added, "for good reasons please consider these remarks personal and private."

A standard horse-power: The evaporation of 30 pounds of water per hour from a feedwater temperature of 100 degrees F. into steam at 70 pounds gage pressure.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* JOHN A. WALKER, *Vice Pres. and Treas.* GEO. E. LONG, *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., April, 1906.

AROUND THE WORLD AGAIN.

While most of the members of the regular traveling staff of the Dixon Company get no further from the home office than Canada, Oregon, California, Mexico and Cuba, Mr. Robert A. Brown extends his trips and acquaintance to far-off Australia, China, Japan, Philippines, India, Africa and other foreign countries.

Mr. Brown has just started on one of these trips.

Drop Mr. Brown down in almost any part of the world and he will at once tell you where he is, what language is spoken, and the most interesting things to be found there.

Mr. Brown is a successful salesman, an observant traveler and a most interesting and instructive conversationalist.

BUSINESS.

The other day we answered a call at the telephone. A strong and clear cut voice gave us the name of the man. He referred us to a National Bank in our city. He added that if the reference was satisfactory to send at once ten gallons of Dixon's Silica-Graphite Paint, and named the way it was to come. He asked if we understood it all right and when we replied we did, he said good-bye, and wrung off.

Every sentence was short and crisp, and the whole transaction took less time than we have taken in relating it.

We took special pains to make prompt shipment and as promptly received check in return.

How different this man is from many men who send in orders on plain paper, and give no reference, and feel grieved and hurt and more or less indignant if we remind them that they are strangers to us and not mentioned in the reference books.

CRUCIBLES FOR BRAZING.

Great advances have been made in the art of brazing in these latter days.

Note this quotation:

"The several parts of the wheel are brazed together by a process of brazing that is in itself the highest development of that art. The entire wheel is immersed in a molten bath of brass which flows into every remote corner and covers every surface with a layer of the metal. This metallic joining makes the wheel one single piece. There is not a separate bolt, rivet, nut, washer or pin in it.

The art of brazing is an ancient one, some fine examples of it can be seen in the metal work of the middle ages and practically no advancement has been made in it till recent years. The manufacture of bicycles probably brought about the greatest revival of the art and it is from this period that the most important improvements date. Dipping, or brazing by immersion, is the most important latter day development, necessitated by the demand for larger operations. Never before, however, has anything so large been attempted as the work now done in the manufacture of the Midgley Wheel, nor by any other process could the work be done.

The bonding of metals by this process is complēte, and the even heating of the whole mass sets up no unequal strains and avoids the distortion that would arise from any less thorough application of heat. While the wheel is red hot it is put under a heavy press and held there till it "sets." It comes out perfectly round and stays so."

The crucibles by which this brazing of an entire "Midgley Wheel" in a single piece is done and without which the job is impossible, are made by the Dixon Company. They are the largest crucibles ever made in the history of the world. Special literature on the subject of "Brazing by Immersion" is prepared by the Dixon Co., and will be sent on request to any address.—J. A. WALKER.

The latest twist on the name of the Joseph Dixon Crucible Company, comes on an evelope addressed to our London office:

"Messrs. the
Jurisdiction Crucible Co., Ltd.,
26, Victoria Street,
London."

WHY THEY ARE CALLED PENCILS.

Mr. T. Keene, the Head Master at the St. Saviour's School, Southwark, on the occasion of the Old Boy's dinner, told some humorous anecdotes of school life. Among them was this one:

"A boy said that pencils were so called because they came from Pennsylvania in the United States of America."

—London *Daily Telegraph*.

UNIONS FOR STEAM PIPE LINES.

By W. H. Wakeman.

Chapter 2.

Fig. 13 illustrates a union in which there are no loose parts, (except the nut,) none that can be loosened, and no packing is required. The head piece is made of brass, but the tail piece and nut are malleable iron. These two metals are brought together in a ball joint that does not easily rust or corrode, but the nut can rust on the tail piece, as both are iron. This can be prevented by the use of Dixon's fine graphite mixed with cylinder oil.

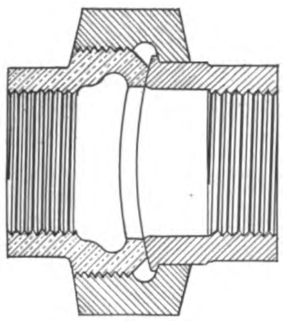


FIG. 13

This union can be put into a pipe line without disfiguring the round brass head piece, although only a common pipe wrench is at hand to do the work with. The nut can be screwed on the head piece as shown in the illustration, with the tail piece in place, by using a monkey wrench. The head piece can then be "made up" permanently on the pipe, after which the nut can be removed and the iron rail piece screwed on the pipe according to common practice.

Very few steam fitters can truthfully say that they have never forgotten to slip the nut on the pipe before screwing on the tail piece, consequently have not had to unscrew it, correct their mistake and screw it on again. Probably the large majority of those who have not had this experience, have not done much steam fitting, which accounts for their good fortune in escaping mistakes.

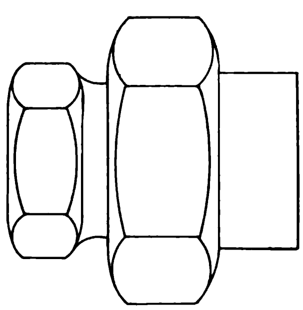


FIG. 14

Fig, 14 is an external view of the same kind of a union, except that the head piece is hexagon in form, or "six square," according to a common expression among working engineers and steam fitters. This makes it stronger, hence less liable to spread or expand when forced on a pipe. It is also convenient to use a monkey wrench on it and it certainly is not proper to apply a pipe wrench to such a place.

Fig. 15 is the same general kind, with a brass head piece of the female type like all previous illustrations, but the iron tail piece is of the male type, making it convenient to use in connection with an ell, a tee or a valve. This tail piece is long enough to permit a pipe wrench to be used on it without spoiling the threads.

Every working engineer and steam fitter is familiar with the ordinary ribbed right and left hand coupling, but I think that few of them care to use it unless it cannot be avoided. The only good feature about it is that when once made tight

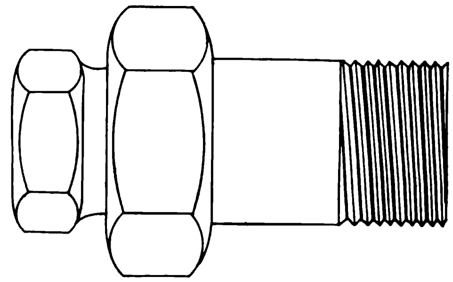


FIG. 15

it requires no more attention than any other coupling, and it will last just as long as any fitting in a plant. Although not a union in a strict sense of the word, still it answers the same purpose.

When one of these couplings is to be used to connect two lengths of pipe, it is screwed on one of them as far as it will go conveniently, then taken off and the number of revolutions required to remove it carefully noted. It is then put on the other end of pipe and the process repeated.

It seldom goes on the same number of revolutions in both cases, therefore the smaller number is subtracted from the greater and the coupling is turned on the longer thread until it agrees with the remainder, consequently if it is then started on the other thread it will become tight on both together and make good joints.

For illustration suppose that when screwed on the right hand thread seven revolutions it is tight enough to indicate that all lost motion is taken up. It is taken off and when given six revolutions on the left hand thread, it is as tight as when tried on the other. It is again removed and given one revolution on the right hand thread, and then started on the left. When screwed up enough to indicate that the joints are steam-tight they will be "made up" alike.

Whenever a right and left coupling is used in place of a union, special care should be taken to cover the threads with Dixon's fine graphite mixed with cylinder oil. Attention is

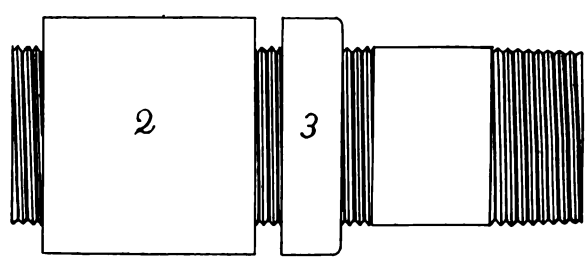


FIG. 16.

again called to this matter, because it is necessary to break two joints when a right and left coupling is to be taken out, and if they are rusted together or made with red lead it will be difficult to start both of them at once.

Whenever a right and left coupling is used instead of a union, the two lengths of pipe to be joined must be sprung apart far enough to let the coupling come in between them, then they are brought nearly together, when the joints are made tight.

It is not always convenient to do this, therefore the device shown in Fig. 16 may be substituted to good advantage. It consists of a nipple with two right hand threads cut on it, one of ordinary length, the other much longer. The short thread is made into a coupling or any other fitting required in the line. The coupling *2* and the lock nut *3* are screwed on lightly. The end of this nipple is then brought to the end of the pipe to which it is to be connected, and is turned backward until it makes a good joint on this pipe, leaving it comparatively loose on the nipple, but *3* is then turned backward until it is tightened on *2* as both of the ends coming together are faced. This completes the joint by taking up all lost motion in the threads in one direction. No packing is required.

(Concluded in May issue.)

THE NEW YORK GRAPHITE INDUSTRY IN 1905.

By D. H. Newland, Assistant State Geologist, Albany, N. Y.

There has been a marked advance in the Adirondack graphite industry during the past year. The output has been larger than ever before.

The mines of the Joseph Dixon Crucible Company, of Jersey City, N. J., are remarkable for their size and the excellence of product.

The graphite occurs in the form of flakes distributed through quartzite. The rock is crushed at the mines and concentrated by means of buddles and air jigs to an average of about 70% graphite. The concentrates undergo further treatment in the mill at Ticonderoga; the final products consist of high grade flake graphite and residue.

The flake graphite is put up in various sized packages, and is also used as a basis for the various forms of lubricants made by the Dixon Company.

The Columbia Graphite Company has opened up a mine near Rock Pond, in the town of Ticonderoga. In character the deposit is similar to the graphite mined by the Joseph Dixon Crucible Company, but it does not average quite as well and the graphite occurs in smaller flakes. Pyrite and pyrrhotite accompany the graphite; they are found both in veins and in granular particles distributed throughout the quartzite. Mica is also present.

—*Engineering and Mining Journal.*

THE MUSIC OF THE DOLLAR.

The following comes to us from Pittsburg, and is worth the reading:

The population of the United States is only five per cent. of the world, yet that five per cent. produced, according to the last census, twenty-two per cent. of the world's wheat, thirty per cent. of its gold, thirty-two per cent. of its coal, thirty-three per cent. of its silver, thirty-four per cent. of its manufactures, thirty-five per cent. of its iron, thirty-six per cent. of its cattle, fifty per cent. of its petroleum, fifty-four per cent. of its copper, seventy-five per cent. of its cotton and eighty-four per cent. of its corn. These things show that Uncle Sam's farm is still a pretty good farm for those who are willing to work.

More than this: Though the nation has only a twentieth part of the inhabitants of the world, it has a fifth of the world's stock of money and a fourth of its coin and bullion, and two-thirds of the world's banking power.

Last year the farmers of the country received more than six billion dollars for their products. This equals the wealth of the country sixty years ago. The mines turned out over one billion, five hundred million dollars' worth of product, while the railroads last year earned over two billion dollars, and have in their employ over one million three hundred thousand people.

The far-reaching effects of all this wealth are incalculable. While it is doubtless true that much of the wealth, for the present, may be centered in comparatively few holdings and hands, yet this wealth is not centralized in such manner as to prevent its distribution. From bank presidents down to the laborer in the street the music of the dollar is heard, singing its song of content and advancement for the people. No people in the world receive as good a rate of wages as the American people. No people in the world are as well housed, well dressed and well schooled as our people. Men at the forge have boys in the college. Women at the tub have daughters who are teachers of music. In America any man may rise from poverty to comparative ease if he has the disposition and the genius of work. Avenues of opportunity are open on every hand. For the man who has the goods, and can deliver them with facility, there is every opportunity for trade and advancement. No one need live in a cottage if he desires a mansion, and has the willing spirit to begin laying, in the cement of hard work, its foundations.

More and more America is coming to be a world power, because it is world-attractive. America is not alone magnetic, she is magnetizing. She enthralls all with the genius of her aspirations and possibilities. America is optimistic, because she sees her possibilities. Americans should be optimistic because they are Americans.

GRAPHITE FOR THE ICEMAN.

A Story in Three Chapters.

Chapter First:—November, 1905. I am having some trouble with oil in distilled water, and would like to try Dixon's Graphite. Please send samples and printed matter.

Chapter Second:—December, 1905. Samples and information received. I must say I think graphite lubrication will give me entire satisfaction if it continues as it has started.

Chapter Third:—February, 1906. Graphite lubrication is entirely satisfactory. I use the graphite dry. I took off the sight-feed oiler and screwed in its place an old grease cup I had lying around. I tried mixing a little oil with the graphite but found it would clog up hole in grease cup, so I cleaned it out and used graphite dry, and find it works very well, in fact I think I am using less steam than before, and my distilled water is perfect.

The above comes to us from the proprietor of an ice factory.

The watt is the unit of electrical power and is the equivalent of one volt multiplied by one ampere. The multiplication, therefore, of any number of volts by the number of amperes flowing in a direct current circuit gives the number of watts. A watt is also equivalent to the expenditure of 44.24 foot pounds of mechanical energy, so that one horse-power is equivalent to 746 watts, or one watt is equivalent to 1/746 of a horse-power.—*Power.*

THE FUNCTIONS OF A PAINT PIGMENT.

The function of a paint pigment consists:

1. In the ability to "cover" underlying coats of another color. "Covering" and "spreading" in paint literature are sometimes confused. A coat of white "spread" to the extent of four hundred square feet per gallon may, or may not, "cover" an underlying coat of light brown. In considering graphite paints this matter of opacity loses importance because the dark paints always "cover."

2. The coloring or decorative feature of graphite paints may be left out of our present consideration.

3. The proper protection to the oil is a most important function, when considering protective coverings. This function was the one we considered most when we adopted the flake form of graphite as the pigment instead of the amorphous form of graphite. We will try to make our reasons clear in a very simple way:

It is very evident that any particle of inert pigment will protect the oil lying beneath it, just as well as the particle of another kind of substance also inert and of the same shape and size. Therefore a particle of graphite will protect no better and no worse than a particle of silica of the same shape and size.

Now, if we have a cube one inch in dimension, it will lie in contact with six square units of a surrounding substance like linseed oil. But if we split up this one cube unit into ten laminæ or flakes, the mass will now lie in contact with twenty-four square units of oil, the volume remaining unchanged.

On examination these particles will appear just as large as before splitting, because only one dimension has been changed.

This will explain why the Dixon graphite pigment is so much finer than it appears, and really finer than other pigments which, to the eye, appear finer than Dixon's.

The desirability of the flake or scale form of pigment is well shown in the application of gold leaf to places where the greatest durability is desired, and graphite is just as permanent as gold.

4. The presence of pigments permit the coats to be laid heavier. Paints spread to 500 square feet per gallon gives a skin about one three-hundredth of an inch in thickness. When applied to 1,000 square feet per gallon, the skin is just one-half as thick, or one six-hundredth of an inch. If the two coats dry without wrinkling or blistering, the oil gives about three times the protection in the first case that it does in the second.

The life of a paint is ordinarily one of simple wearing out. The disintegration begins at the exposed surface and proceeds until the coat is too thin to be longer protective.

We do not believe that any manufacturer of paint will claim that a coat one twelve-hundredth of an inch thick, or at the rate of 2,000 square feet per gallon, will afford proper protection, although it has been so stated. If so, then we may assume that when a coat applied at 1,000 square feet per gallon is half worn away, it will need renewal. Hence it is plain that a coating twice as thick as another, practically offers three times the protection.

The argument of great spreading capacity is good, but only for the man whose whole object is to get the work done cheaply, not well. In our early days the Dixon Company used to advise this extreme spreading, but we discovered our error. Dixon's Silica-Graphite Paint can be spread out to 1,000 square feet with but little trouble, but we advise against it; 600 square feet is enough and 500 square feet is better.

The only drawback to the use of graphite as a paint pigment is that it tends to thin coatings. The smooth, unctuous character of graphite permits it to be brushed out to an extent unequalled by any other pigment.

This characteristic of graphite of course enables the work to be done with a small amount of labor and wear of brushes, and it is in this way a good feature, but the tendency to thin coating needs correction, and we do it by not removing all of the silica.

The use of fine silica as a paint pigment is extensive in England and throughout the Continent. The lack of opacity or covering power of silica is of no importance in purely protective coatings, its hardness is very desirable in that it furnishes considerable resistance to abrasive action. Silica is to graphite paint what the alloy is to gold in the manufacture of watch cases, chains, rings, etc., that are used for ornament where they are subject to abrasion and wear.

Makers of some graphite paints claim a high degree of purity of graphite used in their paints. We have noted that sometimes the claim is made as high as "95% carbon," but we note that they do not claim that this "95% carbon" is all graphite. There is no way of determining whether it is 60, 70, 80, or 90% graphite, but it makes no difference, for as we have said above, a particle of graphite offers the same oil protection as a particle of any other inert substance of the same shape and size.

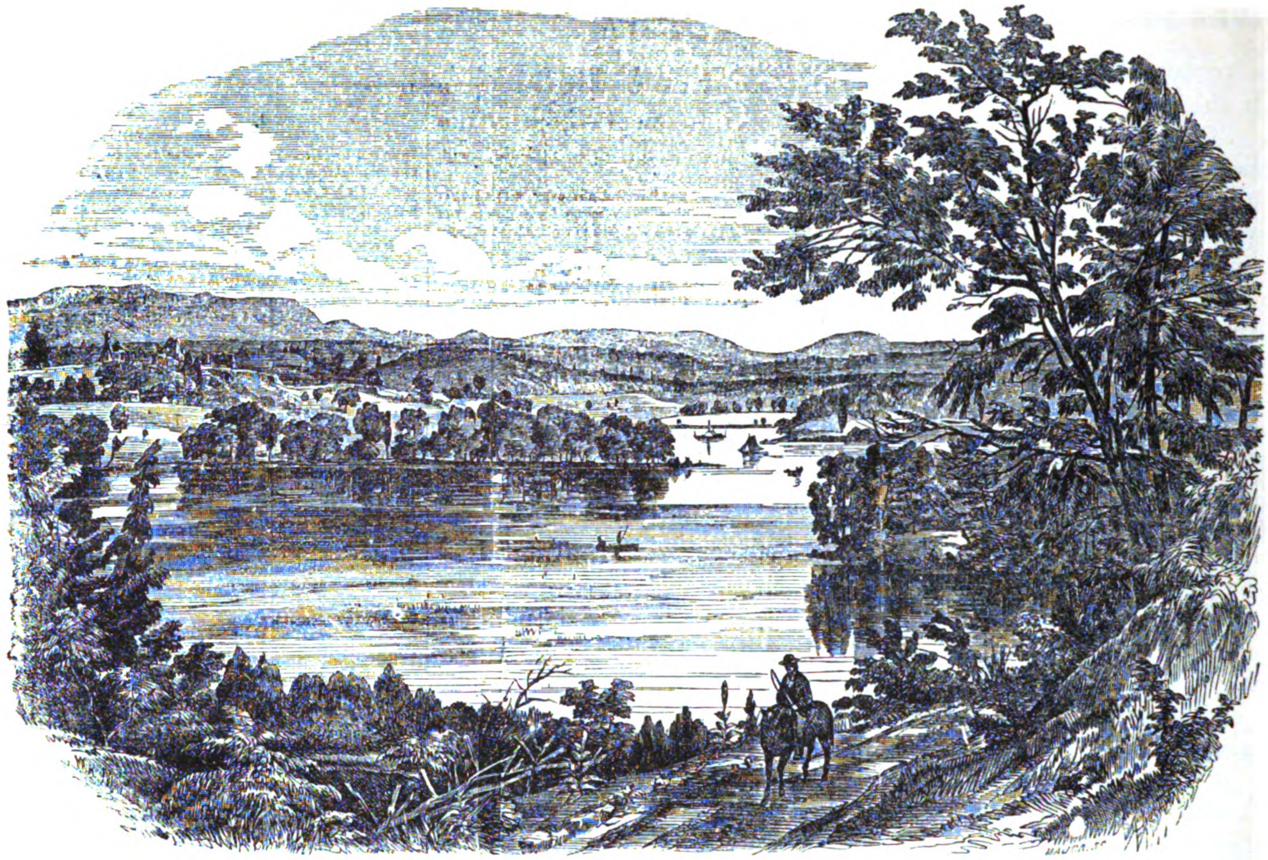
In all of the foregoing it has been assumed that the graphite in the Dixon pigment exists as a flake; the proof is easy, measure several of the flakes of Dixon's Lubricating Graphite by means of a micrometer caliper graduated to ten-thousandths. You will find many flakes give no indication of having thickness, and there will be very few as thick as one two-thousandths of an inch.

COMPENSATION OF THE "STIDDY" JOB.

Our good friend with $1,000,000 a year cannot eat much more or better food, or drink much more or better drinks, than we can. If he does he will be sorry. He can have more places to live in and enormously more and handsomer apparatus of living, but he can't live in more than one place at once, and too much apparatus is a bother. He can make himself comfortable and live healthfully. So can we. He can have all the leisure he wants, can go where he likes and stay as long as he will. He has the better of us there.

We have the better of him in having the daily excitement and discipline of making a living. It is a great game—that game of making a living—full of chances and hazards, hopes, surprises, thrills, disappointments and satisfactions. Our million-a-year friend misses that. We may beat him in discipline, too. We are apt to get more than he does—the salutary discipline of steady work, of self-denial, of effort. That is enormously valuable to soul, body and mind. He can't buy it. We get it thrown in with our daily bread.

—EDWARD S. MARTIN, in the *Atlantic*.



We reproduce this month a picture of Ticonderoga taken from the foot of Mt. Defiance.

This picture was published in "Gleason's Pictorial Drawing-Room Companion," in 1854.

The picture gives a view of the ruins of Fort Ticonderoga, so celebrated before and during our Revolutionary War.

The Dixon Company's graphite mines are situated a comparatively short distance from the Fort.

Fort Ticonderoga was erected by the French in 1756 and was called by them Carillon and by the Indians Cheonderoga, signifying sounding waters, on account of the rippling and musical rapids at the outlet of Lake George.

The Fort passed into the hands of the Americans through the bravery of Col. Ethan Allen, on the 10th of May 1775, who demanded it in "the name of the great Jehovah and the Continental Congress."

AIR BRAKE CYLINDER LUBRICATION.

Mr. Otto Best, who conducts the Air Brake Department of *The Railroad Herald*, has the following to say about the lubrication of air brake cylinders:

"I was surprised a few days ago when a certain gentleman, one who visits a great many of the railway yards and repair shops in the United States, made the statement that some railways are still using car oil, engine oil, or valve oil for the lubrication of their air brake cylinders, notwithstanding the fact that this method not only burns up the leather, dries it out and does not lubricate the cylinder and its parts, and above all you have a defective, leaky brake.

"Too many air brake inspectors lose sight of what, in my opinion, is the most important part of the air brake, i. e., proper lubrication, and first-class packing leathers properly applied to the cylinder. A first-class grease, and only about two ounces, or about a tablespoonful of brake cylinder grease will do more good and last longer than a gallon of any other oil that may be used. The grease will adhere to the walls of the cylinder and keep the packing leathers soft and pliable. When using brake cylinder grease great care should be taken as to the amount applied to the cylinder. After quite a number of experiments it was found that if the walls of the cylinder were painted, or coated, like you would apply white lead to the jacket of an engine, the best possible results were gained. Too much grease is harmful. It will roll in the cylinder and cause packing leathers to leak. Try it."

The Dixon Company manufacture a triple valve and air brake grease that is used by several roads and regularly adopted by one of the leading trunk lines. The instructions for its use are, to lubricate the wall of the cylinder sparingly, and to lubricate freely between the packing leather and follower.

STENOGRAPHERS' PENCILS.

Mr. Robert B. Bradbury, court stenographer at Muncie, Ind., writes us that Dixon's "Stenographer" pencils, Nos. 490 and 491, are the best he has ever used.

That while the 490 is softer than 491, yet after using one for a while he finds it good to change off to the other.

Dixon's "Stenographer" pencils are made in three degrees of hardness: 489, soft; 490, soft-medium; and 491, medium.

While Mr. Bradbury finds No. 489 too soft for his use, yet many young women stenographers who have a very light touch prefer it.

"Pack my box with five dozen liquor jugs," is said to be the shortest known sentence containing all the letters of the alphabet.

DIXON'S LUMBER PENCILS AND CRAYONS.

Made in Over one Dozen Different Colors and of the Finest Materials it is Possible to Obtain. They Represent "Dixon Quality."

Dixon's Lumber Pencils and Crayons, originally made for lumber men and lumber dealers, have now found their way into the hands of all men who require a pencil that will mark smoothly and easily and make a clean and distinct mark.

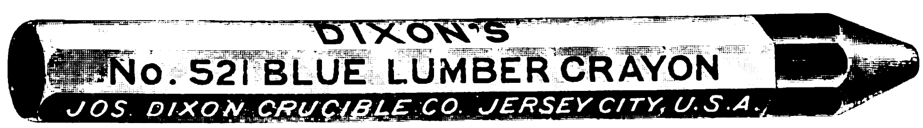
The vivid and durable color of Dixon's Red Crayon is most favorably known to every surveyor who has marked his stakes on the Western prairies where the colors of all other makes of crayons have had short life, due to the storms and the blaze of the sun.

We give below a brief description of the Dixon lumber pencils and crayons.

DIXON'S BLACK LUMBER PENCILS.

Trade Nos.

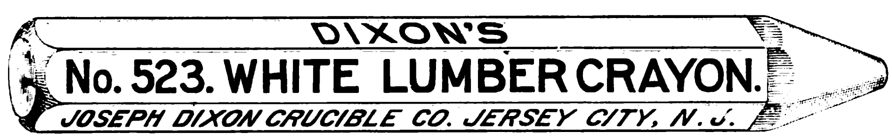
360—Square.		
359—	"	Hard.
361—Hexagon.		
362—	"	Hard.
365—	"	Soft.
365½	"	Very Soft.



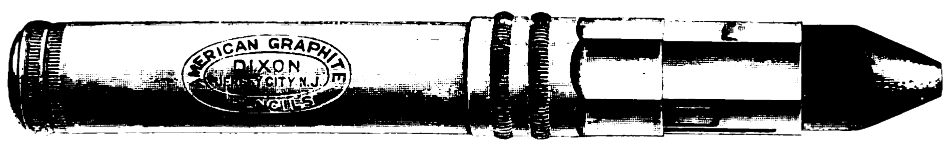
DIXON'S COLORED LUMBER CRAYONS.

Hexagon Shape, Paper Covered.

Trade Nos.	Trade Nos.
494—Carbon Black	495—Brown
496—Yellow	497—Terra Cotta
520—Red	521—Blue
521½—Soft Blue	522—Green
485—Violet	492—Pink
493—Orange	



Dixon's White Lumber Crayon No. 523 is intended for marking on dark colored woods and it is equally useful for marking on iron and steel.



503 NICKEL HOLDER FOR LUMBER PENCILS AND COLORED LUMBER CRAYONS.

This is designed to hold the Japanned Lumbers, but will be found equally convenient for holding those which are paper covered, if the crayons are stripped of their covering.

Packed one dozen in a box. Six boxes in a carton.

Correspondence solicited from all who are interested.

A NEW TEST OF DIXON'S FLAKE GRAPHITE.

Made by Prof. Goss of Purdue University, and Demonstrating its Value as a Lubricant and its Mechanical Affinity for Metal Surfaces.

The Lubricating Mixture.—In considering the manner in which the graphite under test should be applied in lubricating the rubbing surfaces of the testing machine, it was deemed desirable to use as light an oil as was available, since by so doing but little lubricating effect would be realized from the vehicle and the maximum service would be secured from the graphite. An attempt to use water proved unsatisfactory because of the tendency of the rubbing surfaces to corrode under its influence, and kerosene was finally adopted as the most convenient and the most satisfactory vehicle. Throughout the test the lubricant employed has been either kerosene, or mixtures of kerosene and Dixon's Flake Graphite.

Kerosene as a Lubricant.—Before attempting any work with graphite the value of the vehicle was first determined. That this might be done, the machine was operated under kerosene lubrication for a considerable period, the pressure between the rubbing surfaces being gradually increased as they became more worn in service, the effect of the process upon the co-efficient of friction being noted. This process of wearing down rubbing surfaces in the presence of kerosene involved more than 600,000 revolutions of the test machine. The heaviest pressure that could be sustained by the rubbing surfaces under this lubrication was fifty pounds per square inch of surface, and the lowest co-efficient of friction developed was .00547. This record was accepted as representing the performance of kerosene as a lubricant.

After the 633,287 revolutions involved by the process described in the preceding paragraph, a mixture, by weight, of two parts kerosene and one part Dixon's Flake Graphite was made. This mixture had the consistency of thin paste when stirred, but the flakes of graphite quickly settled when permitted to stand at rest. The immediate effect of applying this mixture as a lubricant was to increase the co-efficient of friction, but this in its maximum effect was momentary. Without change or any modification of the lubricating mixture, the co-efficient of friction rapidly fell, first to the value given by the kerosene alone, and then to still lower limits, so that after 10,000 revolutions, occupying a period of something less than thirty minutes, the co-efficient of friction, under the influence of the mixture of kerosene and Dixon's Flake Graphite, became 83.9 per cent. of that obtained from the use of kerosene alone. Conditions thus secured were continued during more than 400,000 revolutions of the test machine, for the purpose of determining beyond doubt the minimum co-efficient of friction under the conditions stated, subsequently the pressure between the rubbing surfaces was increased by increments of ten pounds, until a maximum of 110 pounds per square inch had been secured. Beyond this limit lubrication failed.

The observations show that as the pressure was increased, the co-efficient of friction diminished, the minimum value being .00296. The immediate effect, therefore, of adding Dixon's Flake Graphite to the kerosene was, first, to permit an increase of load from fifty pounds per square inch to 110 pounds per square inch, that is, an increase of 120 per cent.; and, second, a reduction in the co-efficient of friction from .00547 to .00296, that is, a reduction of 45.9 per cent.

Endurance of Flake Graphite.—Having secured these results, it was next sought to ascertain the endurance of the graphite as a lubricant. This was done by removing all graphite from the machine and by rinsing all parts involved, including the rubbing surfaces, with kerosene, after which the machine was operated under a pressure of 100 pounds per square inch in the presence of kerosene alone. Under these conditions, the lubrication was aided by such particles of flake graphite as naturally adhered to the rubbing surfaces. It was expected, however, that these particles of flake graphite would sooner or later disappear and that the conditions would return to those originally found for the kerosene alone. Each morning the rubbing surfaces were removed from the machine and all parts carefully rinsed for any particles of graphite, and the work of the day proceeded, usually to the extent of 150,000 revolutions. After eight day's running and 978,000 revolutions, no diminution in effect could be discovered. Both the capacity of the bearing and the co-efficient of friction developed remained unchanged. A microscopic inspection of the surfaces showed the presence of flake graphite upon them. Whether the amount was sufficient to account for the results obtained, or whether in the earlier stages the presence of the graphite served to control the finishing of the metallic surfaces to permit them to give highly satisfactory results, are questions which can not be determined. The probability is, however, that without the graphite the results would not have been secured.

SPECIFIC HEAT OF GRAPHITE.

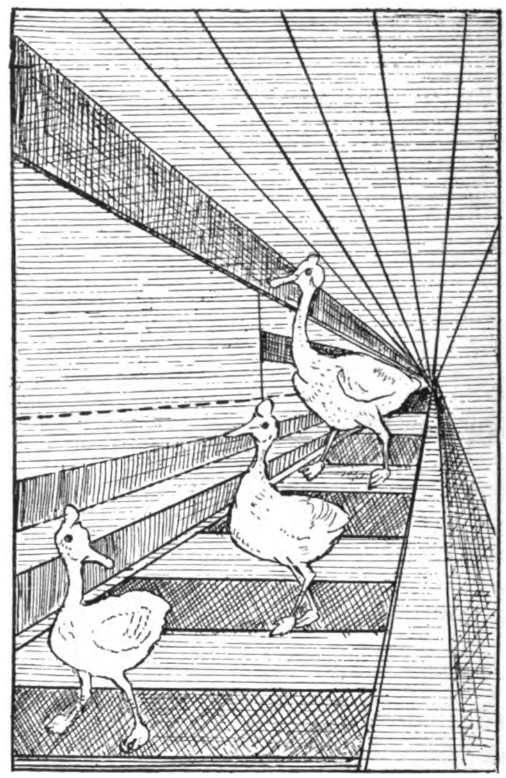
We have been asked concerning the specific heat of graphite at temperatures ranging from 200 degrees Fahrenheit to 800 degrees Fahrenheit.

Believing that some of our readers may be interested in this question we give the specific heat of graphite from 200 degrees Fahrenheit to 1,200 degrees Fahrenheit.

We are considering pure graphite only, and the degrees that we are giving are close approximates but are not given as absolutely correct.

The specific	heat	of	graphite at	200	degrees F.	is	.200
"	"	"	"	225	"	"	.300
"	"	"	"	250	"	"	.400
"	"	"	"	275	"	"	.500
"	"	"	"	300	"	"	.600
"	"	"	"	325	"	"	.700
"	"	"	"	350	"	"	.800
"	"	"	"	375	"	"	.900
"	"	"	"	400	"	"	.1000
"	"	"	"	425	"	"	.1100
"	"	"	"	445	"	"	.1200

Some of our readers may not be familiar with the meaning of specific heat. When equal weights of two different substances at the same temperature placed in similar vessels are subjected for the same length of time to the heat of the same lamp, or are placed at the same distance in front of the same fire, it is found that their tempertures will vary considerably. For example, as many of our readers are aware, the iron work on the chair in the hot room of a Turkish bath will be very much hotter than the wood work and a piece of iron will be much hotter than water, although both have been receiving the same amount of heat. Hence, it is clear that the supply of heat which is sufficient to raise the temperature of one is not sufficient to raise the temperature of the other. Conversely one substance will give out much more heat than the other because it has received more. This is especially notable in water which is always considered a standard, as it has the highest specific heat, taking in quantities of heat largely in excess of anything else and giving out much more in return.



ILLUSIONS OF THE SENSES.

"Seeing is believing," is a trite phrase.

It may surprise many to be told that we should not entirely trust our eyes, nor any other one of our external senses.

The unfortunate part of it is our internal senses are so dependent upon our external senses that it is difficult to tell "where we are at."

Measure with that accurate eye of yours the goose in front and the goose in the rear, and afterward take the actual measurement and you will very likely find the goose in front just a little bit taller than the one in the rear.

THIS VERSE WILL APPEAL TO SALESMEN.

The following verse was brought from Chicago by Dud Johnson, of the Dixon Crucible Company, and handed to the superintendent of the factory at Jersey City. When Dudley was set on for impudence, he crawled and said the poetry was written by E. E. Huber, of Eberhard Faber. We don't know the facts:

Everybody works but the factory,
They sit round all day;
Always writing letters,
"Expect to ship," they say;
Customers keep on calling—
New stories we must tell,
Everybody works at the factory—
Yes they do, like ——.

—*Geyer's Stationer.*

CIGARS AND LEAD PENCILS FOR BUYERS.

Trying to Obtain the Favor of Buyers and to Lay the Foundation of a Future Sale by Giving Cigars and Lead Pencils to Buyers.

The *Engineers' Review* has a frequent and clever correspondent who signs himself Bill B. Banger. Bill hits the nail on the head a great many times. What he says in the following comes home to us with force when we recollect that some of the younger salesmen of the Dixon staff always want about ten gross of pencils to give away while the older salesmen probably do not ask for a dozen.

Bill says, that after reading considerable about grafting and summing up the *pros* and *cons*, he found that when he looked himself straight in the face he could not deny that he had not been a grafter in a mild way. He says: "I will be honest and say that I knew that the drummer wasn't giving me those cigars and lead pencils because he thought more of me than he did of his wife and children, if he had any, but because he wanted my trade in his stuff, and he just naturally thought that I was a cheap skate enough to give him my orders so that I could get a few cigars and lead pencils a few times a year.

"The drummer knew what he was after and so did I, and I will have to admit, if I am going to be honest with myself, and if I ain't with myself I won't be honest with any one else, that those pencils and cigars were a case of graft, pure and simple, even if of a mild form. I am not so sure but what there was a little dishonesty on my part, for I took those pencils and cigars when I knew I didn't intend to order any supplies from that fellow, then or any other time. I suppose there are hundreds of engineers who have and are taking cigars and lead pencils just the same as I did, not because they want to sell their honesty for a few lead pencils and cigars, and that's what it amounts to, but because they didn't stop to consider the question and thought as long as the cigars and pencils were coming their way they might as well have them.

"After I had come to the conclusion that the matter of bribes had to be cut out, I just waited for the next supply man to try to get next to me, and I didn't have to wait long, for they are as thick as fleas on a dog in summer up around these diggings. The first one who tried the cigars and lead pencil game was a mighty slick cuss and was deserving of a better fate. I lit out right and left, and told him that he must have a mighty high opinion of Bill B. Banger if he thought that he was selling himself for a few cigars and a couple of lead pencils, and when he suggested that perhaps a box of cigars would be more to my liking, I kicked over the traces in good shape, and when I got through there wasn't a more surprised chap in our neighborhood.

"I guess it don't take long for a thing to get around, for since my little discussion on graft I haven't had as much as a pinch of snuff offered me, and I don't know of any one who is getting any more benefit out of the new order of things than your uncle Bill B. Banger."

El Grafito Puro en Laminas de
DIXON
PARA LUBRICAR

Aumenta grandemente la eficacia de todos los aceites y grasas y reduce positivamente la friccion cuando todos los otros lubricadores no lo alcanzan.

La lamina es la unica y adecuada forma de Grafito que asegura una lubricacion perfecta, y el Grafito de Ticonderoga es el unico Grafito extraido de las minas del que puede obtenerse una lamina absolutamente uniforme.

LUBRICACIÓN DE GRAFITO.

El desarrollo en nuestros dias de maquinaria de gran velocidad y de gran fuerza, ha hecho que el asunto de una buena lubricación sea cosa más seria de lo que jamás ha sido hasta ahora. Las máquinas compuestas, los grandes motores, las correas y engranajes de ejes pesados tan comunes ahora en las grandes plantas y fundiciones movidas por fuerza de vapor, presentan muchos nuevos problemas de fricción y de lubricación.

Con vapor en extremo caliente y una alta presión hay dificultad en lubricar adecuadamente los cilindros y válvulas de vapor.

Bajo estas condiciones, el grafito puro en láminas de Dixon ha resuelto tan gran número de los problemas, que parece ser la clave para resolver otros muchos más. Un ingeniero prominente dijo una vez: "Cuanto más sólido sea el lubricador que pueda usarse en cualquier lugar, tanto mejor será la lubricación."

Para todos los cilindros de máquinas, el grafito puede usarse seco, ó mezclado con un poco de aceite ó agua. De los tres modos se ha probado con resultados satisfactorios. Para cojinetes pesados puede mezclarse con aceite ó grasa, y con aceite para los cojinetes ligeros. La cantidad que ha de usarse depende de la tensión de los cojinetes. Es preferible usar muy poco á usar demasiado, porque el grafito es una sustancia solida. El grafito cubre las supergcies de los cojinetes con una chapa lustrosa y untuosa que no tiene rival en punto á lisura, facilitando á las piezas moverse con la más minima fricción.

Cuanno se aplica á cojinetes calentados, el grafito pronto rellena las desigualdades de las superficies del cojinete debidas á incisiones, rozamientos, &c., haciéndolas lisas y parejas, después de lo cuol el cojinete pronto se enfría.

Es igualmente útil para superficies de madera ó metal: en una palabra, en todos los casos en que haya fricción.

Es útil de muchísimos modos en un cuarto de máquinas, y ningún maquinista bebería estar sin una caja de grafito.

NÚMEROS PARA EL COMERCIO Y TAMANOS DE LOS PAQUETES.

Nos. para el comercio.

632—Envases de papel de 1 lb
633—Latas con tapas de tornillo de 5 lbs.
634— " " " " " 10 "
644—Cajas de 25 lbs.
645— " 50 "
646—Cuñetes de 100 "
647—Barriles de 350 "

Los números para el comercio y tamaños de los paquetes del grafito común son los que se dan arriba. Si se deseare un grafito finamente pulverizado (conocido como No 2), debe especificarse en el pedido. Los números para el comercio serán los mismos, pero cada lata ó paquete tendrá pegado un membrete ó rotulo que lo distinga.

Joseph Dixon Crucible Company.

(Compañía del Crisol Joseph Dixon).

Casa establecida en 1827.

La más antigua é importante de su clase en el mundo.

Fábrica y Oficinas generales,

Jersey City, Nueva Jersey, E. U. de A.

Sucursales en Nueva York, Filadelfia, San Francisco, y 26 Victoria Street, Westminister, Londres.

Con representantes en todo el mundo.

En todo el mundo civilizado no hay industria ni siquiera individuo que deje de emplear el grafito en alguna forma.

El grafito, que también se conoce con los nombres de plombagina y lápiz plomo, es una de las formas del carbono, como lo son el diamante y el carbón de leña. Ni el calor á 4000 ó más grados Fahrenheit ni los ácidos ni los álcalis lo alteran ó afectan. No hay substancia conocida que tenga la suavidad del grafito puro. Estas propiedades le hacen valiosísimo por sus infinitas aplicaciones prácticas, y se emplean enormes cantidades de grafito en la fabricación de crisoles, materias lubrificantes, lápices, betunes para estufas, pinturas preservativas y gran número de otros artículos.

El origen del grafito, así como su naturaleza, formación, varia procedencia y general utilidad podrían ser objeto de interesante lectura, siendo de advertirse que su importancia posible y nuevas aplicaciones futuras solamente se están empezando á comprender.

El grafito no es soluble, ni fusible ni volátil, pero sí es combustible, formando el monóxido de carbono, ó el bióxido con más frecuencia. Es el grafito excelente conductor del calor y de la electricidad, mientras que en lo suave y resbaladizo no hay materia solida semejante. Estas condiciones lo hacen inapreciable para multitud de objetos en la actualidad, y serán las que lleven el aumento de sus aplicaciones más allá de nuestras mayores esperanzas.

Como materia lubrificante, ya se le emplee seco ya se le use mezclado con aceites ó grasas de cualquiera clase, tanto los hombres científicos como los que sólo son prácticos reconocen que no hay absolutamente nada que iguale al grafito.

In finding the storage space required for a certain number of tons of coal, multiply the number of tons by 50 and the result will be the number of cubic feet required. For instance, if 300 tons of coal are to be stored, it will require 15,000 cubic feet of space, or a bin 50 feet long by 30 feet wide by 10 feet high. —*Power*.

WHEREVER there are bolts and nuts, glands and stuffing boxes, gaskets and flanges, faced connections and ground joints, threaded pipes and its fittings, there should Dixon's Graphite Pipe Joint Compound be used.

Wherever used, it has made firm friends and is much valued.

THE GREAT TRANSITION.

By Henry T. Bailey,
Editor of the School Arts Book.

"Hello!" said I, "what's that?" And I stooped to pick it up.

"That?" replied the boy who happened to be passing through the school yard with me. "That is nothing but a lead pencil."

"But it is a whole one," said I, "and with a rubber on the end."

"I know it," said the boy.

"What? Do you mean to tell me that you have seen this here before?"

"Yes, everybody's seen it."

"All the children in your school have seen this lying here day after day, and not one boy has picked it up?"

"Of course. What should we pick it up for? There's plenty in the schoolhouse; the town buys 'em."

And I had been given a text for a long meditation. Not pick up a whole new lead pencil? And a pencil with a rubber on it!

When I was a boy we prized even slate pencils. A boy who hooked anybody's slate pencil was baited until he gave it up; but a lead pencil—we fought for lead pencils as the Greeks and Trojans fought for Helen. We scoured the countryside for old horse-shoes to sell to the blacksmith for money enough to buy a lead pencil. And having it, we cut our private mark on it, guarded it, kept it as our last resource in trade. Many a time a precious two-inch lead pencil has turned an important jackknife trade one way or the other. I never had but one lead pencil at a time, and often hardly that, until I was fifteen years old. And these ten-year-olds scorn to pick up a whole one with a rubber! Think of it! The best eraser I had was a piece of rubber-boot heel!

—*Journal of Education.*

DIXON'S GRAPHITE CURVE GREASE.

For Lubricating Center Plates of Cars.

During 1905, the officials of one of the large railroads in the middle South made full and careful tests on the center plates of their cars with Dixon's Graphite Grease, such as we have been furnishing trolley companies for track curves.

The results showed so satisfactory that the grease was adopted as a standard, and has been used with great success.

It should be remembered that wherever grease or oil lubrication is required, better results can always be attained by the addition of from three to five per cent. of Dixon's Flake Graphite.

The secret of an improvement in lubrication is Dixon's Flake Graphite.

AUTOMOBILE RUNS SMOOTHLY.

A correspondent says: "Dixon's Graphite is the best thing I ever used to make an automobile run smoothly. I mixed some of Dixon's No. 635 Special Graphite with heavy cylinder oil for the lubrication of transmission gears, roller bearings, differential and chain of my "Buick" Model "C" motor car.

"It is wonderful how Dixon's No. 635 Graphite prevents the wear of the chain and quiets the noise of gears. I find that roller bearings treated with this graphite take on a very high polish and become as smooth as glass."

HIGH PRICES FOR POTTERY.

Passing the door of the American Art Galleries in 23rd St., New York, and noticing a sale was in progress I got a catalogue and entered and took a seat. No. 891 was up for bids—it was a vase 14½ inches high, of ancient date, beautifully decorated. It was "knocked down" for $2,900, later follows No. 901, a blue and white vase 16 inches high and 7½ inches in diameter, made in China in 1723 and was regarded, the catalogue says, a "matchless piece." It started at $25, went $5 at a jump, till it reached $60, then slowed up a trifle with $100 at each raise, when it was finally struck off for $7,900. The little vase would weigh about 3 pounds. With that sum of money one could buy two hundred thousand lead pencils or four hundred tons of pig iron.—J. A. Walker.

DIXON'S GRAPHITE CUP GREASE.

Dixon's Graphite Cup Grease is made in several degrees of hardness, so as to meet requirements of temperature and conditions.

One customer writes us that he has found Dixon's Graphite Cup Greases far superior to any oil for upright bearings.

Another customer writes us that for fan bearings he has found it unequaled for smoothness of feed, wearing qualities and lubricating value. "In fact," he adds, "it is superior to anything in the way of a lubricant I have ever used."

It may be that all who make use of grease lubricants will find it to their advantage to try Dixon's Graphite Cup Greases.

A sample will be sent free of charge to any one interested.

MOTOR CAR CHAINS.

We have from time to time called the attention of our readers to Dixon's Graphite Compound for motor car chains. It is an article that every one who runs an automobile with a driving chain should use. As a lubricant it is without an equal, and if properly applied keeps the chain not only thoroughly lubricated but free from dampness, dust and dirt, which are so destructive to chains.

Our London office writes us that they are having a good demand for Dixon's Motor Chain Compound and also for Dixon's No. 687; this latter is getting famous throughout England as an unapproached gear grease. They also send us this little testimonial which comes from one of their customers: "Please send me another one of those bricks of graphite for the lubrication of motor car chains. It is an *immense success.*"

GRAPHITE ON MANILA ROPE DRIVES.

We are informed that Mr. George W. Hannan uses Dixon's Flake Graphite No. 1, mixed with cylinder oil, on manila rope drives.

He claims, it is said, the ropes last as long again as they did before he used the graphite. The manila ropes have a graphite core.

I have been accused of encouraging opium smoking because I furnish stuff for "pipe joints." In explanation I will state that this stuff is Dixon's Pipe Joint Compound and has nothing to do with the opium habit. On the contrary, it is a cure for the habit of inhaling gas from faulty joints.—*My Lines.*

IT MATTERS MUCH.

Telegram from financier in New York to his partner in Cleveland:

"Am about to close a big deal with Skinham. What kind of a man is he?"

Reply from Cleveland:

"He is like a fish."

Telegram from New York:

"Wire at once what kind of a fish—shark or sucker."

—Cleveland *Leader*.

DIXON'S GRAPHITE AIR BRAKE AND TRIPLE VALVE GREASE.

Mr. Will. W. Wood, in *Locomotive Firemen's Magazine* writes as follows: "It has long been a hard matter to find a lubricant just viscous enough to hang on and stay where you want it, to have all the necessary qualities and be of the same consistency summer and winter, not to dry up nor gum —for use in the discharge piston, triple valves, rotary valves and all cool-air brake parts.

"A newly prepared lubricant, Dixon's Air Brake and Triple Valve Grease, is a graphite of impalpable fineness, ground with an oil of such texture that it becomes at once the lubricant that everybody interested has been looking for. Spread on a plate, it is seen to be highly transparent and free from lumps and roughness."

Oscar Wilde's "De Profundis" was, as every one knows, written in jail; John Bunyan's "Pilgrim's Progress" was written in jail; Cervantes wrote part of "Don Quixote" in jail; Defoe planned "Robinson Crusoe" during a term of enforced confinement, and Leigh Hunt wrote "Rimini" under the same circumstances. Raleigh's "History of the World" was written in the Tower of London; Tasso composed much of the "Jerusalem Delivered" in imprisonment, and Silvio Pellico penned in a cell the words that touched the heart of Europe.

—*N. Y. Sun.*

THERE are scores of cases where drops of red lead have gotten into a pipe from the joints and caused no end of trouble in regulators, valves and cylinders.

Dixon's Pipe Joint Compound is mostly pure flake graphite and tends to lubricate every rubbing surface it reaches.

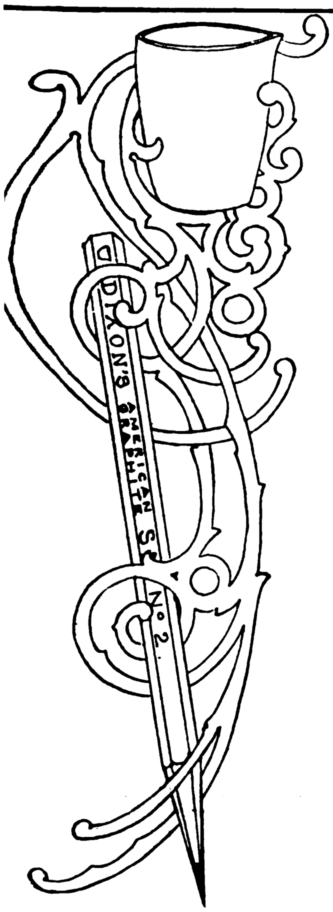
Its economy, ease of application and varied uses commend it to every man who tightens a nut or fits a pipe.

Let be thy wail, and help thy fellow-men,
And make thy gold thy vassal, not thy kind,
And fling free alms into the beggar's bowl,
And send the day into the darken'd heart;
Nor list for guerdon in the voice of men,
A dying echo from a falling wall;

* * * * *

And lay thine uphill shoulder to the wheel,
And climb the Mount of Blessing, whence, if thou
Look higher, then—perchance—thou mayest—beyond
A hundred ever-rising mountain lines,
And pass the range of Right and Shadow—see
The high-heaven dawn of more than mortal day
Strike on the Mount of Vision! —TENNYSON.

Graphite.



VOL. VIII. MAY, 1906. No. 5.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

"VIS VIVA."

We are told that "vis viva" means "what the stuff will do." We are glad to know this, for we know what the Dixon "stuff" will do, and we therefore know that its "vis viva" is all right.

We are told in the matter of protective paints that chemists can go no further than to analyse the material substances and determine their composition—that is, take them apart; and may form some opinion of their durability, but he cannot at all predict its "vis viva"—that is, what the stuff will do, and what it will do is the only true measure of its value or worth.

There is some recompense for being many years in existence; we don't have to depend on prediction for the "vis viva"—we know it.

Therefore, we are not obliged to depend on the chemist or prediction to measure the value or worth of Dixon's Silica-Graphite Paint. It has been on the market for forty years and longer. It has protected metal and iron-work longer and more completely than any other protective paint known. It is the oldest graphite paint, and its "vis viva" was known and demonstrated before any other graphite paint was able to "sit up and take notice."

Dixon's Silica-Graphite Paint is the paint for you to buy if you want the best possible protection for your metal and wood-work.

It is made in four colors only: dark red, dark green, black and natural graphite.

THE LOVELINESS OF GRASS.

Grass is the forgiveness of nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated.

Forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality, and emerges upon the first solicitation of spring.

Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the wasting sea.

It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates and determines the destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression.

Banished from the thoroughfare and the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes the throne from which it has been expelled, but which it never abdicates.

It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose.

It yields no fruit in earth or air and yet, should its harvest fail for a single year, famine would depopulate the world.

—J. J. INGALLS, in *Kansas Magazine.*

GEAR GREASE.

"Smut Face" in *Engineer's Review* says:

"The following is a very good compound for lubricating gears: Use two parts linseed oil, four parts tallow and one part blacklead (graphite). It is better to apply hot with a brush when the gears are in motion."

HOW POWER IS SAVED.

The manufacturer of a well known automobile says: "A gallon of gasolene contains a fixed amount of power. Part of the power in that gasolene can be lost in operating an engine full of friction and bad mechanism and workmanship."

Unnecessary friction in engine and in the mechanism throughout, which is employed in transmitting the power to the driving wheels, means loss in power and it means cost.

The first and most particular function of Dixon's Flake Graphite is to fill up the microscopical irregularities of all the bearing surfaces, making a marvellously smooth surface.

Its next function is to lubricate those surfaces, and this it does because it is the best solid lubricant known to science or practice. It greatly helps all oil or grease, and should therefore be used in conjunction with all oil or grease lubrication wherever possible to do so.

A locomotive and stationary engineer of the Far West writes us as follows:

"I would like to say a word for Dixon's Flake Graphite. I have used it on all kinds of hot bearings both in stationary and locomotive service for the past eight years, and it never failed me once."

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
304 Market St., San Francisco. 26 Victoria St., London.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* JOHN A. WALKER, *Vice Pres. and Treas.* GEO. E. LONG, *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., May, 1906.

DIXON CRUCIBLE MEETING.

Old Board of Directors and Officers Re-elected.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Company the old board of Directors, consisting of Edward F. C. Young, John A. Walker, Edward L. Young, William Murray, George T. Smith, Joseph D. Bedle and George E. Long, was unanimously re-elected. The board of directors re-elected the former officers, namely, Edward F. C. Young, President; John A. Walker, Vice-President and Treasurer; George E. Long, Secretary. Judge Joseph D. Bedle was also re-elected as counsel.

The stockholders present expressed themselves as thoroughly satisfied with the management of the company by its officers.

Of the total number, 7,345 shares, there were represented 7,173 shares.

THE extreme hardness of red lead that has "set," makes the breaking of a joint a risk to pipe, fittings, tools and muscles.

Dixon's Graphite Pipe Joint Compound will make a steam, air or water-tight joint resist heat, cold, acids or alkalis, will remain soft indefinitely, enabling joints to be separated with perfect ease without injury.

Total Loss of Dixon's San Francisco Branch.

The San Francisco branch of the Joseph Dixon Crucible Company, so far as we can learn, is a total loss.

The manager, Mr. James G. Allen, wired us from his home in Oakland, that the earthquake occurred so early in the morning that no one had gone to the office, but so far as he could learn the Dixon store had gone down, as No. 304 Market Street was in the stricken district.

THE MAYFLOWER.

The trailing *Arbutus*, or Mayflower, grows abundantly in the vicinity of Plymouth, and was the first flower that greeted the Pilgrims after their fearful winter.

Sad Mayflower! watched by winter stars,
And nursed by winter gales,
With petals of the sleeted spars,
And leaves of frozen sails!

What had she in those dreary hours,
Within her ice-rimmed bay,
In common with the wild-wood flowers,
The first sweet smiles of May?

Yet, "God be praised!" the Pilgrim said,
Who saw the blossoms peer
Above the brown leaves, dry and dead,
"Behold our Mayflower here!"

"God wills it: here our rest shall be,
Our years of wandering o'er,
For us the Mayflower of the sea
Shall spread her sails no more."

—WHITTIER.

PROVIDENCE, R. I., November 20, '05.

Joseph Dixon Crucible Co.

Gentlemen:—I received your samples of Dixon's Graphite Air Brake and Triple Valve Grease, and Dixon's Special Graphite No. 635, and am giving them a good test on the locomotive I am running. I find that the grease does everything that you claim for it, and it certainly is the best lubricant I have ever used. My tests proved entirely successful in every respect, and I am very glad to recommend Dixon's Graphite Air Brake and Triple Valve Grease.

Dixon's Special Graphite has proved an excellent thing to cure the groaning and overheating in an air pump.

Very truly yours,
(Signed) SAMUEL T. MASSEY.

President Eliot, of Harvard, sometime ago spoke on "What Uplifts a Race and What Holds It Down." He said in part:

"Every race that has risen from barbarism to civilization has done so by developing all grades of productive labor, beginning with agricultural labor and rising through the fundamental mechanic arts, and mining, and quarrying, to manufacturing, elaborate transportation, trade, commerce, the fine arts and professional labor. Respect for labor of all sorts, for the simplest as well as the most complex forms, will be manifested by every rising race."—JOHN A. WALKER.

UNIONS FOR STEAM PIPE LINES.

By W. H. Wakeman.

Chapter III.

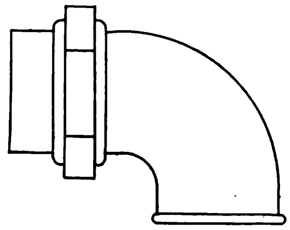


Fig. 17.

Fig. 17 illustrates a female union made in connection with an ell, thus forming a compact and convenient combination.

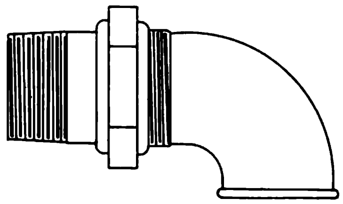


Fig. 18.

Fig. 18 is a similar device exept that the tail piece of the union is male instead of female.

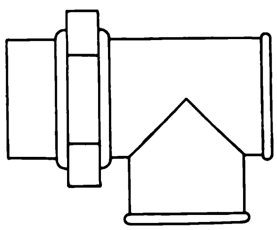


Fig. 19.

Fig. 19 is a union formed in connection with a tee. The tail piece is female.

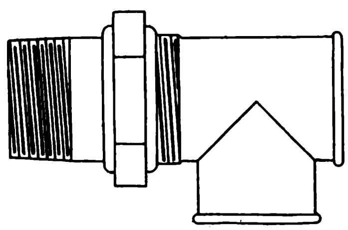


Fig. 20.

Fig. 20 is a tee and a union combined, but the tail piece is male. This is convenient when a valve is wanted at this point.

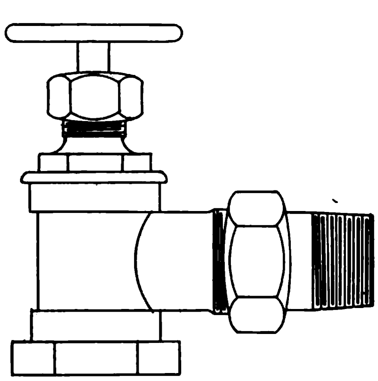


Fig. 21.

Fig. 21 illustrates angle valve, the lower part or inlet of which is female according to general practice. The outlet is made to serve as the head piece of a union followed by a nut and male tail piece. This combination is frequently found on radiators, but I wish to call attention to the fact that there is no good reason why it should be confined to such service, as it is suitable for steam pipe lines, hot water pipes, or any other place where an angle valve and a good union are required.

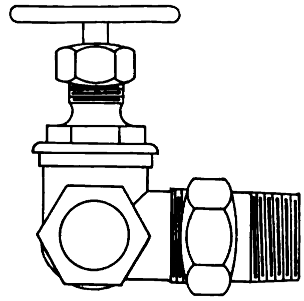


Fig. 22.

Fig. 22 is a corner valve and a union combined. There are many places where a valve in a pipe line located close to a brick wall is in the way, but the line turns a corner and a valve at this point would be out of the way and at the same time could be easily reached for use. While such an arrangement is unique, it would prove convenient and attractive.

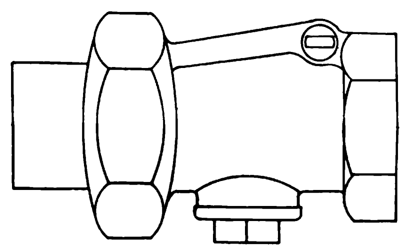


Fig. 23.

Fig. 23 is the external view of a swing check valve of approved design, combined with a union, and Fig. 24 is a sectional view of the same device. It is not customary to use a check valve in a steam pipe line, but such a valve is sometimes put in between a boiler and the header into which the steam is discharged, the object of which is as follows: When this boiler is full of cold water it is impossible for an ignorant

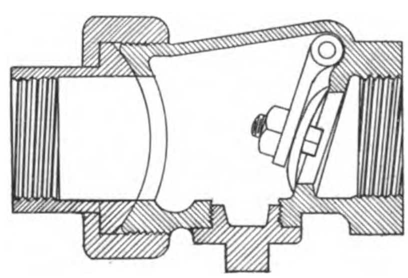


Fig. 24.

engineer or fireman to turn steam from other boilers into the upper part of this one, and if a tube in it bursts it can only liberate the steam in that boiler, as none can come back from the others. If this combined check valve and union is located in the hot water line between the heater and the boiler it will work well. When the check valve needs repairs it can be reached by unscrewing the nut and springing the valve to

one side. There is a plug in the bottom of this valve which makes it possible to clean out dirt of any kind that naturally collects here, without removing anything else.

Has any reader ever put a check valve on a pipe line so that water could not be forced through in the direction that he intended it to go? This is a mistake that we do not care to own, but many of us have made it.

A steam fitter with whom the writer is acquainted was telling of this mistake made by others, and the effect of it when an attempt is made to use the check valve so connected. When the small job on which he worked was completed, a check valve he used was found to be connected "wrong end to" and had to be taken off and turned around, to the amusement of himself and others.

All kinds of unions that have ground or faced joints should be thoroughly tested before they are put into service. If cold water under high pressure is applied it is generally considered a good test, because there is no heat to expand the parts and fill up small imperfections in the surfaces.

For some unaccountable reason a certain class of engineers and steam fitters seem to believe that cold water exerts more strain on a test piece than steam, although pressure may be the same in both cases. This is certainly a mistake, for there is no differencc except that an imperfect article will generally leak worse when cold, than when heated and expanded.

Some tests are made under steam pressure, as that is considered best, because it is under practical working conditions. Air pressure is applied in other cases with good results. To overcome the difficulty of determining whether air escapes or not, the joint to be tested is put under water. Air that passes the joint appears in the form of bubbles, rises to the surface and disappears from sight.

THE WOMAN IS RIGHT.

A Bit of Gossip about Dixon's Stove Polish.

Sometime ago we saw up in a Connecticut town a marvelously bright stove and we asked the lady, a neat and trim old-time Connecticut housekeeper, what sort of stove polish she used. Why, she said, I have never used anything but Dixon's, except I was induced to try paste stove polish once, but when I found it gummed up I went back to Dixon's. We asked her how often she had to polish her stove with Dixon's Polish to keep it looking like that; like that, she exclaimed, why, I was thinking that I ought to give it another rubbing as it has not been polished for three months or more.

We were reminded of this conversation by a letter which comes to us from Mrs. Carrie Wetzel, of Elvaston, Ill., under date of February 20, 1906. The letter is as follows :—

"I called at a neighbor's some days ago and her stove looked so nice that I said, you have just blacked your stove, haven't you? She replied, not since we put it up for the winter. Then I asked her what kind of stove polish she used and she said that she used Dixon's Stove Polish and got it in Keokuk. She gave me your address and as there are several of us that want to get some of Dixon's Stove Polish and as we can't get it here, I write you to find out how you will sell it by the dozen. Please let us hear from you soon."

We have sent the above letter to the Manager of our Chicago Office and have no doubt that later on the ladies in Elvaston will have their wished-for supply of Dixon's Polish.

As a matter of fact, so far as polishing material is concerned, one cake of Dixon's Polish is equal to five or six boxes of paste polish, to say nothing of its far greater durability. It happens, however, that as Emerson says, "most of us are as lazy as we dare to be" and the ordinary housekeeper is very apt to fall into the habit of using a quickly applied paste stove polish without regard to its durability or economy.

LIKES DIXON'S GRAPHITE AXLE GREASE.

If Customers Don't Find It the Best Thing of The Kind, They Can Come and Get Their Money Back.

Mr. E. N. Hoon, whose business is general blacksmithing, wagon repairing and horseshoeing, at Bishopville, Ohio, writes us that he is having a good trade in a small way in Dixon's Graphite Axle Grease. He has so much faith now in Dixon's Graphite Axle Grease that he tells the people to use it and if it is not the best thing they ever used to come back and get their money. He has one or two other kinds of axle grease that he is now selling at reduced price, so that he can get rid of it and sell Dixon's only. He asks us to keep Dixon's Axle Grease before the people, as he knows that all who use it will be benefited.

"GRAPHITE AS A METAMORPHOSING AGENT."

An Engineer's Graphic Account of How He Left Things at Night and How He Found Them in the Morning. Things that Stuck and Refused to Move at Night, Moved with Unexpected Ease in the Morning, and Almost Knocked Him Out.

Matters had been going from bad to worse. Hot journals, melted brasses, cut guides and scratched cylinders had followed one after the other in rapid succession. I knew as I tossed and turned in my bed, that if matters did not change for the better, something would drop.

Just before I had shut down for the night, the postman had handed me a sample can of Dixon's Pure Flake Graphite, which I had hastily looked at and then tossed onto my desk.

As I tried to go to sleep, I tried counting up to ten, as a means of dispelling the seemingly severe attack of insomnia, but the word graphite ran through my brain until it nearly drove me crazy. Whenever a hot box came to mind or a scratched cylinder, the word graphite dinned itself into the chain of thoughts which were passing swiftly through my brain.

Finally in desperation I arose and, dressing, wended my way to my engine room, determining to put into practice some of the suggestions which had come to me while endeavoring to go to sleep. If graphite, as the label on the can said, was good for lubrication, why would it not be good for my troubles. I concluded to try, and hence my journey to my engine room.

The engine room was dark and silent, save for the occasional spit of steam as it leaked out around the stem of a valve. Lighting a lamp, I began work at once. On the outer pillow block I had been in the habit of using a kind of hard grease in conjunction with oil, which had given considerable satisfaction, although the conditions were not ideal. Removing the grease, I thoroughly mixed in a small amount of graphite and then returned the new compound to nestle against the engine shaft in the journal. The main pillow block was attended to in the same manner.

Next came the crank-pin and also the crosshead-pin and guides. This was an easy matter, for I merely mixed in a little graphite with the oil in the can, and after thoroughly shaking, the oil cups were filled with the mixture.

When it came to the cylinder I found myself in luck. Someone had plugged up the holes that had been tapped for a hand oil pump, and all that was necessary to do in order to equip the cylinder with a dry graphite lubricating device, was to remove the plug and screw in a dry graphite pump.

Thinking that I might as well do a good job, I put graphite on the hinges of the furnace doors to make them swing easy, also on the hinges of the engine and fire room doors; doped the damper regulator and all the valve stems. Before I had finished, the entire plant had been "graphited," and then I returned home and went to sleep.

The next morning I arrived at the plant at the usual time, and so busy was I with the thoughts of getting started up on time that I forgot all about my experience with graphite the night before, and grabbing one of the chains which were attached to the furnace doors to assist in opening them, I gave it a pull with my accustomed vigor which resulted in my tripping over a slice bar lying on the floor, so easily did the door swing open.

When the damper regulator began to operate it regulated the steam half pound closer than ever before, and the slightest draft of air was enough to slam the doors of the engine and fire rooms. When steam was up, the oil cups feeding, and everything ready for starting, I grasped the throttle with both hands, intending to just crack it, forgetting for the time being that I had saturated the packing around the valve-stem with graphite, as well as thoroughly lubricating the threads with the same. Instead of just cracking the throttle, the wheel made a full turn when I applied my strength to it. The engine was as much surprised as I was, I guess. It gave a leap forward, while I, regaining my balance, gave the throttle a whirl, closing it so firmly that it required a monkey wrench applied to the wheel before I could open the throttle again.

Of course, the engine stopped on the center, and so getting a piece of timber to pry it off, I put one end under the spokes of the flywheel, using a wooden box as a fulcrum, and bearing down with all my strength I went sprawling on the floor. The engine had turned so easily, due to the graphite on its bearings, etc., that not near the strength had been required to turn it as before.

Finally I got started and began to think that after all my experience with graphite was not going to be much of a success. To sum up, I had strained my back in falling over the slice bar, raised a lump on my head due to the engine room door swinging against it, bit my tongue when the throttle opened and barked my shins in prying the engine off the center. But when I got the engine going I was more than repaid for my crippled condition.

The hot boxes disappeared, the crank and wrist-pins ran as cool as the proverbial cucumber, and smooth—well, I can't express in words the satisfactory operation of everything from that time on. I didn't content myself with the sample can of graphite, but ordered enough to fill every requirement and to always have plenty on hand.

The night I could not sleep proved to be the means of bringing many a night to me when I could put all care away and turn in without a thought of trouble, because I had learned to use graphite.

M. Leder,
No. 16 Garden Street, Cleveland, Ohio.

THE IMPORTANCE OF GOOD LEAD PENCILS.

An English paper writing on the subject of pencil wastage in the Government departments, says: "Many of those in the employ of the Government could a tale unfold of wasted pencils. Pencils that are almost unused being thrown away wholesale because it is more economical to sacrifice the pencils themselves than the time and labor that would be involved in continually paring, so as to be able to write with them.

"The public has very little conception of the importance of a really good lead pencil as compared with a bad one, to those people whose business necessitates the constant use of a pencil in preference to a pen. Under certain circumstances a pencil is indispensable; business cannot be got through without it; and where this is the case, to provide a bad pencil—one the point of which is always breaking, and the graphite of inferior quality, or the wooden case not true-grained—amounts, practically, to depriving the workman of his tools.

"Pencil wastage also arises from the more serious cause, which we have already indicated, namely, the necessity of discarding bad pencils by people who simply cannot get through their work with anything else but good ones. And with this hint to 'heads of departments' we leave the subject for the present."

SPECIFIC HEAT OF GRAPHITE.

On page 626 of April GRAPHITE we had an article on the "Specific Heat of Graphite." By some hocus-pokus the columns of figures were transposed and we now reproduce the article with the figures as they ought to have been.

The specific	heat	of graphite	at	200	degrees F.	is	.200
"	"	"	"	300	"	"	.225
"	"	"	"	400	"	"	.250
"	"	"	"	500	"	"	.275
"	"	"	"	600	"	"	.300
"	"	"	"	700	"	"	.325
"	"	"	"	800	"	"	.350
"	"	"	"	900	"	"	.375
"	"	"	"	1000	"	"	.400
"	"	"	"	1100	"	"	.425
"	"	"	"	1200	"	"	.445

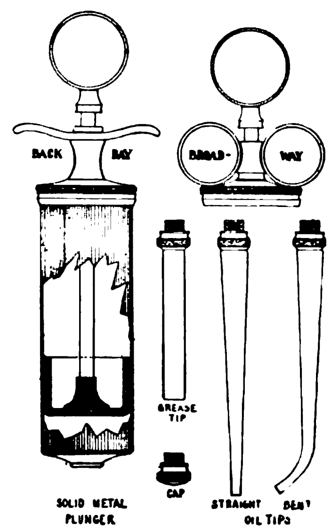
Some of our readers may not be familiar with the meaning of specific heat. When equal weights of two different substances at the same temperature placed in similar vessels are subjected for the same length of time to the heat of the same lamp, or are placed at the same distance in front of the same fire, it is found that their temperatures will vary considerably. For example, as many of our readers are aware, the iron work on the chair in the hot room of a Turkish bath will be very much hotter than the wood work and a piece of iron will be much hotter than water, although both have been receiving the same amount of heat. Hence, it is clear that the supply of heat which is sufficient to raise the temperature of one is not sufficient to raise the temperature of the other. Conversely one substance will give out much more heat than the other because it has received more. This is especially notable in water which is always considered a standard, as it has the highest specific heat, taking in quantities of heat largely in excess of anything else and giving out much more in return.

A NEW GREASE AND OIL GUN.

A Handy Device for Getting Grease or Oil in Out-of-the-way Places.

There are always times when it becomes necesssary to introduce oil or grease in some out-of-the-way place. Sometimes oil can be introduced with the ordinary squirt can, only to find that the heat of the parts causes the oil to run off at once.

Then it is when one needs a "gun," and a gun on which perfect reliance may be placed in the delivery of the gun and in the quality of its contents.



We show herewith cuts of a "gun" made by the Randall-Faichney Company, Boston, Mass. It contains no leather washer to become dry or over soaked, or cut when reloading. All parts are brass and all parts represent the highest workmanship and care.

In our experiments with this gun we have successfully used in it Dixon's heavy graphite axle grease, and found the delivery not difficult. The lighter graphite greases will work nicely even through the oil tip.

With a gun of this kind a suitable graphite grease may be quickly and neatly applied to any small working part of the motor machinery where there is undue friction caused by heat or hard work, and where the soft, smooth Ticonderoga flake graphite can be fully utilized in reducing friction and cooling the heated parts.

The cuts show section of body of gun, the grease and oil tips and the retaining cap, as well as different styles of handle.

For further information and for prices we refer to the manufacturers named above.

THINK THIS OVER.

I saw the other day three eight-dollars-a-week young fellows; I say eight dollars a week, for they looked it.

All three were smoking; all three were sitting in what they called a "Dago's" shine chair getting a "shine." After the shine all three went to a barber shop for a "shave." Here were three wastings of cash by these eight-dollars-a-week boys.

First, they need not smoke, or need not until they can better afford it. Next, they should both shave themselves and shine their own shoes. Done, as it doubtless is twice a week, it costs them fifty cents a week; this is $26.00 per year, and is equal to the interest on $500.00 a year at five per cent.

I don't speak for undue saving; I rather bespeak liberal spending if one can afford it, but an eight-dollar-a-week boy has no judgment when he throws away $500, for this is what he does when he wastes the interest on that much capital. The saving system, until you can afford to spend, would put many a "young feller" beyond the caprices of fate.

—J. A. WALKER.

FIRST MAKER OF MATCHES.

We read in one of the papers that in 1827 John Walker, a druggist in a small English town, tipped a splint with sulphur, chlorate of potash and sulphide of antimony, and rubbed it on sandpaper and it burst into flame. The druggist had discovered the first friction-chemical match, the kind in use to-day. It is called friction-chemical because it is made by mixing certain chemicals together and rubbing them.

Although Walker's match did not require the bottle of acid, it nevertheless was not a good one. It could be lighted only by hard rubbing and it spluttered and threw fire in all directions. In a few years, however, phosphorus was substituted on the tip for antimony and the change worked wonders. The match could now be lighted with very little rubbing and it was no longer necessary to have sandpaper upon which to rub it. It could ignite when rubbed on any dry surface and there was no longer any spluttering. This was the phosphorus match, the match with which we are so familiar.

After the invention of the easily lighted phosphorus match there was no longer use for the dip-splint or the strike-a-light. The old methods of getting a blaze were gradually laid aside and forgotten. The first phosphorus matches were sold at twenty-five cents a block, a block contained 144 matches, and they were used by but few. Now a hundred matches can be bought for a cent. It is said that in the United States 150,000,000,000 matches are used in a year. This, on an average, is about five matches a day for every person.

Whether the above John Walker belongs to the family tree of Mr. John A. Walker, Vice President, General Manager and Treasurer of the Dixon Company, we do not know, but it so happens that all the John Walkers that we have run across so far, whether John A., or John H., or plain John, are all up-to-date, wide-awake and with an eye to the main chance.

THE USE OF A LIMPID OIL WITH GRAPHITE WILL REDUCE FRICTION TO ONE-THIRD THAT OF THE ROLLER BEARING.

This statement seems to be justified by the following:

The October, 1905, issue of *Machinery*, contains a report of a series of tests on roller bearings, made by Professor C. H. Benjamin, at the Case School of Applied Science, which are of especial interest in view of certain results which have been obtained by Professor Goss, from plain bearings lubricated with kerosene and Dixon's Flake Graphite.

Professor Benjamin's experiments were made upon several different kinds and sizes of roller bearings in common use. The purpose of the experiments was to determine the friction developed by such bearings when run under different conditions of load and speed. The apparatus employed was similar to the well-known Thurston oil testing machine, and was in every way well adapted to the purpose for which it was used. Professor Benjamin's reputation as an experimenter, and the highly refined character of the apparatus he employed, leave no question as to the accuracy of his work.

In the results which were obtained by Professor Benjamin from the use of roller bearings 1 15/16 inches in diameter, in comparison with those obtained from the step bearing testing machine made use of by Professor Goss in connection with his study of graphite under similar conditions of pressure it was demonstrated that the co-efficient of friction developed by the roller bearings was greatly in excess of that developed by the use of graphite and kerosene in a step bearing. Thus, when the pressure is 40 pounds per square inch, the co-efficient of friction for the graphite and kerosene is .00459, while the average co-efficient for the two roller bearings is .018, or 3.92 times greater. When the pressure is 50 pounds per square inch, the co-efficient of friction for the graphite and kerosene is .00442, and for the roller bearing .0175, or 3.95 times greater. There are no conditions which can impair the value of this comparison except that a higher speed was employed with the roller bearing than with that which was lubricated. But as the co-efficient of friction of the lubricated journal generally diminishes with increase of speed, a correction of this would make the differences in results greater. The step bearing was able to carry a load of 110 pounds per square inch, while the greatest load carried by the roller bearing was 61 pounds per square inch, or only 55.5 per cent. as much as that of the step.

Professor Benjamin also made tests of plain bearings and found that "the friction of roller bearings is less than that of plain bearings."

There is no secret in all this. The plain bearings experimented on by Professor Benjamin were undoubtedly lubricated with an oil possessing considerable body, whereas in the presence of graphite a very light oil will suffice. The friction of lubricated journals is largely a matter of viscosity of the lubricant. For any given service, the use of graphite will always present a reduction in the viscosity of the liquid lubricant and hence a reduction in friction. The extent to which such a change may be carried is, however, not commonly recognized. It is well illustrated by the fact that a graphitic mixture, well designed for the service expected of it, gave results which leave the roller bearing quite distanced in the race.

"GAYEST PART OF HEAVEN."

Just what we would do in the "gayest part of heaven" we do not know, and we have never heard what they do in that part of heaven. A correspondent, however, writes us and says: "The Joseph Dixon Crucible Company should by all rights, and they will, get into the 'gayest part of heaven. They have made my life easy in steel mills where I have used Dixon's Graphite Lubricants on hot roll bearings. It never failed to cool the very hottest of big bearings; but, suffering Moses, it was like pulling eye teeth to get the managing director to buy Dixon's. He kicked like a mule at what he called 'the costly black stuff'."

As we have already mentioned many times before, the Dixon mail bag is indeed a curiosity shop. Letters come to us from all parts of the world, written in various languages and touching on many subjects and lines concerning which we have little or no information. Nevertheless we answer all letters and it is perfectly safe to say that no company is more widely known than that of the Joseph Dixon Crucible Company. This probably is due to the fact that the Dixon Company is the only company on the face of the earth making an entire line of graphite products; it therefore touches all industries and individuals.

EVER GREATER NEW YORK.

By the estimate of the State census enumerators Greater New York has now 4,140,622 people, an increase of 703,420 over the Federal census figures of 1900.

That is to say, in five years the city has added a San Francisco and a Buffalo combined, or two Cincinnatis, seven Albanys, a dozen Hobokens. This is progress in municipal population to which no known parallel exists in the world's history. All roads led to Rome, but Rome had no ocean liners to add their quota of humanity seeking new homes.

The time when we shall outstrip London and become the world's metropolis is now measurably near.

According to Dun's figures the cost at wholesale of a year's supplies of all the necessities of life for a single individual—meats, breadstuffs, food of all kinds, clothing, metal and miscellaneous requirements—was for last year $97. Adding to this the retailers' profit in a city in which the cost of living is very high, this total may be reasonably placed at $125.

Thus the 700,000 of new mouths to feed and bodies to clothe necessitate the purchase every year from the retailer of material to the value of $87,500,000.

Where is this enormous sum to be obtained? What new industries, what increase of old, must be necessary to provide it! Within five years additions have been made to the volume of retail trade greater than the entire assessed valuation of Rhode Island or Virginia. To the clothing dealers of the city there is a yearly addition of $14,000,000, to the butchers $8,000,000.

To house these newcomers five in a family would require 140,000 new flats, to provide which nearly 5,400 seven-story single flat-houses would be needed.

A single annual visit of each one to the theatre, occupying orchestra seats, would increase the box office receipts by $1,400,000.

A single ride of each on a surface car in a year would add $35,000 to the company's income. Assuming that at least one in five has become a regular patron of transit lines, it would be interesting to know how many new cars, "L," surface and Subway, have been put in use to accommodate them. The increase of population by 420,000 in Manhattan and the Bronx helps to explain the present congestion of all means of transit. —*New York World.*

A GOOD EXAMPLE.

It is related of Joe Tracey, now a mechanical expert, engineer and writer upon automobile subjects, that when a chauffeur he was never content with the running of his car. As the story runs Tracey, while driving for J. Insley Blair, was complimented unstintedly upon the running of the Mors car by Mr. Blair. Tracey said nothing, and on the following day Mr. Blair said: "Joe, this car seems to run even better than yesterday." Still Tracey said nothing, and it was only by accident that Mr. Blair found that in the face of his praise of the car the day previous, Tracey had worked all that night going over the car. Yet the conscientious fellow had said nothing, asking for no commendation for the hard work for which Mr. Blair paid him handsomely. It was not wonderful, therefore, that a man so constituted should have advanced little by little to a more prominent position.

—*The Automobile Magazine.*

BUSINESS LETTER WRITING.

The following clipping from a recent writer gives in a nutshell the requisite of a business letter.

"Business correspondence is talking on paper. Its purpose is to create a favorable impression of the house it represents, and to secure, hold, and increase trade. That applies as well to social as to business letter writing. The letter must have individuality and sincerity; it must arouse interest and be convincing. * * * A correspondent must have a firm belief in what he says."

A business letter, like a book, should have a style, an individuality very marked.

Another point of value is, it should not be too long. If the topic really wants lengthy treatment write two letters, one the next day, and a thread of reference can connect the two and make both more easily managed.—JOHN A. WALKER.

EB AND FLO AGAIN.

Flo was fond of Ebenezer—
  Eb for short she called her beau;
Talk of "tide of love," great Caesar!
  You should see 'em, Eb and Flo.
—Cornell Widow.

Eb and Flo, they stood as sponsors
  When Flo's sister was a bride,
And when bride and groom receded,
  They, too, went out with the tied.
—Yonkers Statesman.

When their first child came—a daughter—
  The nurse, for a larger fee,
Went to someone else who sought her,
  Leaving Eb and Flo at sea.
—Chicago Record-Herald.

This happy couple, Eb and Flo,
  Then named their little daughter—
To be in keeping, don't you know—
  Minnehaha, Laughing Water.
—Springfield Union.

Next came triplets, heaven bless 'em!
  Ebenezer looked quite grave.
Then quoth he to his Floretta:
  "This looks like a tidal wave!"
—Boston Post.

When these cherubs of the sea
  Had the colic—yes, all three—
Eb and Flo both lost much sleep,
  Rocking the "cradle of the deep."
—Grafton C. Allen.

"Eb and Flo at sea?"—not long!
  They'd a taste for Roosevelt's schemes—
Anti-race suicide, their song,
  Made nurse say: "I've lost, it seems."
—Hutchinson (Kan.) News.

The triplets now are cutting teeth,
  And, alas, it hence befalls
That in Eb and Flo's life-voyage
  There are many grievous squalls.
—Rex H. Lampman.

Eb had shown a greed most stony,
  Licking up the golden sand;
Flo with rattling alimony,
  Can't regret their busted strand!
—Brooklyn Eagle.

Eb, like Adam, blamed the lady,
  Sneered: "Flo's one aim was to "climb;"
She retorted: "Oh! your shady
  "Wreckage down the shores of time!"

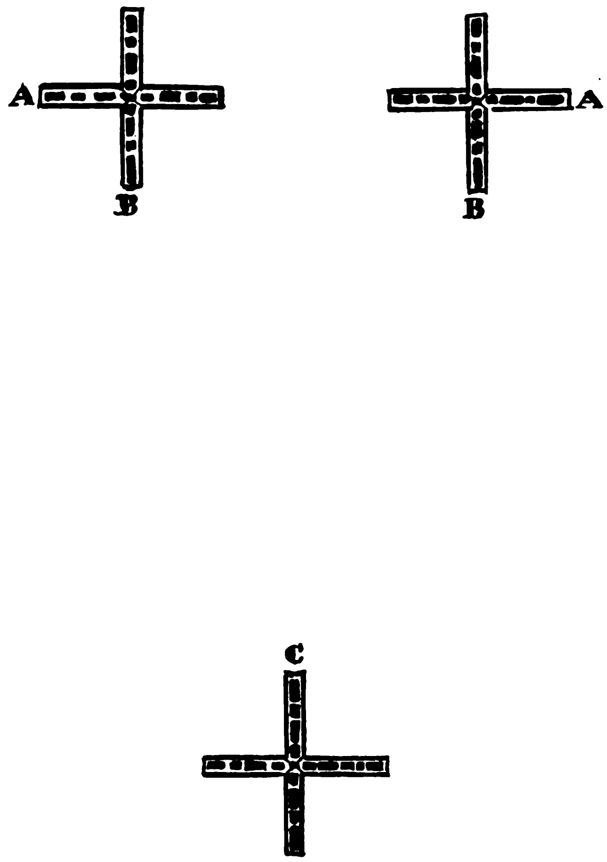
ON LIVING.

We live in deeds, not years; in thoughts, not breaths;
In feelings, not in figures on a dial.
We should count time by heart-throbs. He most lives
Who thinks most, feels the noblest, acts the best.
—Philip James Bailey.

"ILLUSIONS OF THE SENSES."

Under the above title we had in April GRAPHITE a very clever illusion in the size of three geese. This month we produce another that is equally good.

Of all organs of sense, the eye is undoubtedly the most easily and frequently beguiled. Straight lines may be drawn in such relation to each other that they appear curved, and curved lines made to appear straight. The cause of some of these illusions is differently given by scientific writers. None of the explanations is perfectly satisfactory, and we will not attempt any. In the case of the three crosses shown herewith it is said that the effect absolutely contradicts the rule laid down in recent works on mental phenomena, which is that a space filled with objects looks larger than an empty space.



The distance from A to A in the three crosses shown is longer than that from B B to C, which seems considerably to exceed the first.

AN ENGINEER'S EXPERIENCE.

"Flake Graphite is IT," He Says, And He Tells How He Proved It. His Knees Were Weak at One Time, But He Kept His Nerve And So Came Out All Right.

WALLINGTON, N. J., April 2, 1906.

Joseph Dixon Crucible Co.

Gentlemen:—I suppose it falls to the lot of every person having the care of machinery to have a hot bearing occasionally. If it is discovered in time to prevent a temporary shut down, all is well, but it seldom happens that the boxes will not need some repairs in the way of scraping and readjustment, if it does not mean a case of rebabbitting.

The writer had charge of a number of dynamos at one time in his career, and all were fitted with sight feed oil cups, as self-oiling journals at that time had not come into very extensive use—at least on this make of machines—consequently he had his full quota of "hot boxes" and the usual amount of rebabbitting made necessary by such gross carelessness and inattention to duty.

I have profited somewhat by my experiences, and while I am a firm advocate of that old adage, "smooth seas never made a good sailor," I am of the opinion that a great deal of "bad weather" may be well taken care of by closely watching everything under one's care, as vigilance is the price of safety, as well as of liberty, in steam engineering at least.

I am a true friend of Dixon's Flake Graphite, and I will tell you of one instance in which it did me a good turn. I had been "firing" both stationary and marine boilers for some time, and had begun to get well on to thirty years of age before I had confidence enough in my abilities to try for a "job running." I heard of a "berth" in a small plant for a "chief engineer" and mustered up courage sufficient to apply for the position, and to my surprise and trepidation was engaged for the place, and reported one morning in fear and trembling, and will confess that it wouldn't have taken much to "shooed" me back to my scoop shovel and other fire tools; but swallowed hard, stilled as best as I could my wildly beating heart and started in. For the first few months I watched everything as a cat would a mouse, and at the sound of a discordant note in any of the apparatus under my charge, my first impluse was to run—because I couldn't fly.

System is a great thing, I think, around the steam end of a plant anyway, so I started in at the first of inspecting all bearings on the engine and their lubrication fifteen minutes after starting, then the next inspection fifteen minutes later and every thirty minutes thereafter, and so long as I adhered to this method I had absolutely no trouble as regards hot boxes, as any tendency toward heating was discovered in its first stages, but one morning I failed to call around on my usual fifteen minute trip, so that thirty minutes had elapsed before I came to the conclusion of taking a look around the engine; as soon as I came in the room the old familiar odor of "hot fat" greeted my nostrils. It was the crank-pin that needed immediate attention. What passed through my mind on the instant, I would be unable to say, but I remember distinctly of expecting to find "ten cent pieces" lying all around that part of the engine, as the boxes were full babbitt, but I didn't see any when I got there. My next thought was to slow down, but as I had given an uninterrupted service so far, I decided to keep her going as long as steam would turn her. The pin was oiled by a centrifugal oiler, so I just tried a little water for a while. The first that went in sounded as if it touched something hot, and I guess it did. After the water would not fry, I started the oil freely, with occasionally a dose of Dixon's Flake Graphite, and in two hours you would not have known, except for a little muss on the subbase, that the oiler hadn't been tending to his duties. I had not time to take down the connection at noon hour, to repair the supposed damage to the boxes and pin, but gave it liberal lubrication during the remainder of the run, intending to do the job at night, but as it run finely that afternoon, and being situated near a river, so that a supply of water was at hand, I decided to risk it one more day. The next run was made and nothing happened, so I cut the oil down a little until at night I was feeding the usual amount, and the pin running as nice as ever, so I continued to worry along until Sunday, when I would have plenty of time to smooth up the pin and scrape the boxes. Well, I took the thing down and put it up again, and that was all there was to it; the pin and boxes were as smooth as glass and nearly polished enough to see to shave from. I had been using just a squirt of graphite and oil on that pin, as well as on all the other bearings, for about two months before the fracas. I had read that it would prevent cutting under similar circumstances, and by gosh! I proved it. Some time in the future I may get time to say some more good things about Dixon's Flake Graphite. I think it is just about IT. —ECONOMY.

FOR WATER WORKS.

Dixon's Waterproof Graphite Grease for Valves, Hydrants, Etc.

We have been very kindly permitted by Mr. Gailey to print in full the following recommendation of Dixon's Waterproof Graphite Grease, which we do with many thanks to Mr. Gailey.

Altoona, Pa., Jan. 3, 1906.

Joseph Dixon Crucible Co.

Gentlemen:—In reply to your letter of January 2nd, 1906, inquiring whether we are not in need of waterproof graphite grease, would say that we have some on hand yet from which we are using. We find it a very satisfactory article for use in water works on valves, hydrants, etc., and do not use anything else in our line of work. I expect also to ask in our specifications this year that all valves furnished us be coated on the working parts inside with Dixon's Graphite Grease. I believe it will be beneficial to the valves and protect the working parts from rust and corrosion coming from any hard or sulphurous matter in the water.

Very truly yours,

(signed) S. A. GAILEY,

Supt. Altoona City Water Department.

HE who knows nothing is nearer the truth than he whose mind is filled with falsehoods and errors.—JEFFERSON.

We have found this saying to be true in regard to engineers and graphite.

Those whose minds were filled with "falsehoods and errors," due to the use of inferior graphites, were hard to convince of the value of Dixon's Ticonderoga Flake Graphite.

Engineers and mechanics who are familiar with Dixon's cannot be turned from it nor caught by inferior grades.

Dixon's American Graphite Pencils

Few people know all about lead pencils, but everybody ought to know something about them; what pencil, for example, is made and intended for the kind of work they do with a pencil.

There's a Dixon pencil exactly fitted for the kind of penciling you want to do. Dixon's "Pencil Guide" describes the right pencil to use in fifty-four different lines of work. It is an interesting little pamphlet for pencil users; is full of neat and clever illustrations, and deserves a place in your office, home or library. It will be sent you free of charge.

BENEFITS OF GRAPHITE.

An Interesting Article from "The Automobile Magazine," Instructive Alike to the Owner of an Automobile, the Engineer and the Mechanic.

You know how small bits of paper, like the familiar confetti, resist the most patient sweeping, and how strongly they adhere to the floor and fill the cracks and crevices; well, that's pretty much the way that graphite adheres to metal surfaces. The flakes of graphite have much the same proportions as confetti, only very much smaller, their thickness being probably less than three ten-thousandths of an inch. The covering power of a given quantity of flake graphite, it would seem, would greatly exceed that of the same quantity of amorphous graphite, which is made up of irregular granular particles, just as the leaves of a pad would cover a greater area and more smoothly and evenly than the same pad cut into little irregular chunks.

Friction is due to the inability of human skill to produce perfectly smooth surfaces, and no matter how smooth a metal surface may appear to the naked eye, it will always be found rough when examined under the miscroscope. These roughnesses of rubbing surfaces interlock and resist free motion, i. e., cause friction, resulting in wear, overheating and "cutting."

When flake graphite is introduced into a bearing it soon fills up all the pores and irregularities of the metals, imparting a glaze or veneer of marvelous smoothness and high polish. Reduced friction follows such a perfection of bearing surfaces, and there is less heating, less wear and "cutting" is absolutely impossible. Less oil need then be used and even better results obtained, and in no class of machinery is this important feature more appreciated than in the cylinders of automobiles.

The graphite glaze on cylinder walls means better piston fit with less friction and no cutting, rusting or "freezing" of the piston. Flake graphite greatly increases the efficiency of any oil or grease for the lubrication of main bearings, gears, cams, slides and axles, and is the ideal lubricant for driving chains, preventing wear and noise and doing away with the necessity of a greasy chain, which always catches dust and sand. For such purposes the graphite is best combined with a firm wax or fat, which is melted and in which the chain is immersed until the graphite reaches every pivot.

—*Automobile Magazine.*

LABOR LOST.

Our friends, the French, have oftentimes a very pretty wit, as the following literally translated from *Le Sport* will testify:

The automobile rushed down the road—huge, gigantic, sublime. Over the fence hung the woman who works hard and long—her husband is at the Café and she has thirteen little ones. (An unlucky number.) Suddenly upon the thirteenth came the auto, unseeing, slew him, and hummed on, unknowing. The woman who works hard and long rushed forward with hands, hands made rough by toil, upraised. She paused and stood inarticulate—a goddess, a giantess. Then she hurled forth these words of derision, of despair: "Mon, Dieu! And I'd just washed him!"—*The Pneus.*

"GREASE AS A LUBRICANT FOR LOCOMOTIVES."

The *Railway Age* states that during the past five years the use of grease as a lubricant for the driving journals and crank pins of locomotives has rapidly increased, so that now it is the regular practice on the majority of the railroads in the United States and Canada.

Although it has been admitted that oil is a more natural and better lubricant for locomotive bearings than grease, as it has a lower viscosity and offers less resistance to motion; yet, owing to the fact that grease remains on the bearings when they run at high temperatures, the use of grease tends to reduce engine failures. Driving journals and crank pins on large modern locomotives are difficult to maintain in a good state of lubrication with oil for the following reasons: First, they are exposed to high temperature radiating from the firebox and ashpan; second, careless methods at the ash-pit allow locomotives to stand over hot coals, and a neglect to dampen ashes allows dust to collect on the bearings; third, large driving box cellars are difficult to remove and apply, which leads to indifferent and careless methods by those assigned to box packing; fourth, the waste packing is often of poor quality and the jarring of the engine causes it to settle away from the journal. It is probable that this latter is the principal reason why lubrication by oil with waste packing has so often failed on large bearings.

It may be said on the part of the Dixon Company that we have received many letters from engineers in which they claim that for eccentrics and pins, and for many parts of the locomotive, the regular oil, in which five or ten per cent. of graphite has been mixed, gives far better results than oil alone or any form of grease, excepting possibly Dixon's Graphite Cup Greases.

The great smoothness and lubricating value of graphite gives a mixture of oil and graphite a much lower viscosity than any form of grease.

Adolph, an Austrian artisan, adored Anna, an aristocrat. And Anna adored Adolph. Another aristocrat, Alfred, an ambassador, adored Anna. Anna abhored Alfred. Alfred addressed Anna, admitting admiration. Anna assumed amazement. Alfred abjured Anna. Anna admonished Alfred. Alfred adopted aggressiveness. Alfred's audacity alarmed Anna. Alfred attempted abducting Anna. Anna, afraid and agitated, acquainted Adolph. Adolph accused Alfred; Alfred, angered, abused Adolph awfully. Adolph answered Alfred. Alfred attacked Adolph. Anna, aghast, aided Adolph. Adolph and Anna almost annihilated Alfred. Alfred abdicated absolutely. Anna accepted Adolph. Adolph and Anna abruptly absconded and abandoned Austria altogether, arriving at Antwerp, and always abiding abroad afterward. —*New York Sun.*

COULDN'T WAIT SO LONG.

The following correspondence recently passed in the tire trade:

Dealer—Please ship me another case of tires, same as last.

Maker—Cannot ship anything until last case is paid for.

Dealer—Cancel the order. Can't wait so long.

—*The Pneus*

Graphite.

VOL. VIII. JUNE, 1906. No. 6.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

"2 PER CENT 10 DAYS."

What it Means to the Manufacturer.

Just who was the man to start it deponent saith not, but certain it is that we now have a fashion of "terms 30 days, 2% 10 days." Possibly very few manufacturers have considered the cost.

The Sunday Magazine says that since the inducement is 2% for payment in 10 days instead of 30 days, that is for an advance payment of 20 days, the manufacturer offers to discount the bill at the rate of 36% *per annum*, there being 18 times 20 days in the year. He pays or allows $2 in every $100 for every 20 days, or at the rate of $36 per $100 *per annum.*

Some cunning customers, recognizing that money can be borrowed for say 6%, will avail themselves of a liberal cash discount (offered probably as an insurance on credit) of say 5% and couple the payment with a 4-months' note at interest; and oftentimes the vendor yields to the customer, and allows him his cash discount of say $50 on $1000, accepting his 4-months' note with interest on the bill, which at 6% will produce him $19. There is clearly a gain of $31 to the customer; and the general and correct idea is that what is one's gain is another man's loss. For every credit there must be a corresponding debit. Now, what has the manufacturer lost? Clearly, in the first place, his insurance on credit, and secondly his power of using working capital, which will presumably net him considerably more than the 6% he is being allowed for it.

The writer might have gone further and said that unfortunately a good many buyers show a disposition to take the 30 days time and then the 2% additional; but if not quite as bad as that they wait 15 or 20 days, then take the 2% and write a nice letter saying that the treasurer has been away or that the account has been overlooked and trust that the additional few days will make no difference and that the 2% will be allowed.

LUBRICATING TESTS.

Graphite as a lubricant for bearings is coming into favor in many places owing to its remarkable adhesive qualities and staying power when used in easing a revolving bearing. The heavy greases and oils used in former days for lubricating purposes have some qualities lacking in graphite. This may be true in the cooling qualities of oil, which, while it lessens the friction, also tends to reduce the temperature in a heated bearing. But when a bearing is needed to run smooth for a long time without constant attention and repeated doses of lubricant, graphite is much superior.

It has been demonstrated by severe tests that long after other lubricants have lost their value as such, graphite, when once ground into a revolving shaft or bearing, will continue to reduce the friction for almost an indefinite period, or until the shaft or bearing has been roughed. Graphite has an affinity for iron and steel and fills all the microscopic interstices, creating an absolutely perfect journal. The more smooth the shaft or bearing, the easier it revolves.

Graphite is gaining favor as a lubricant in the great mills of the country. It is sometimes mixed with heavy lubricant oils, making a pasty mass for the purpose of making it take hold on a bearing. But this is not necessary, as the graphite will give the same result when mixed with the lightest of oils. Graphite of itself is efficient as a lubricant, although it has a tendency to flake and scatter unless mixed with oil, which holds the flakes together until it becomes thoroughly ground into the metal to which it is applied.

—*American Manufacturer.*

LIFE OF A MOTOR CHAIN.

How it May be Prolonged and the Chain Made to Run Smoothly and Quietly and With Less Friction.

The following letter is from Mr. A. P. Heyer, proprietor of the Heyer Automobile Station, of Bloomfield, N. J. Mr. Heyer, like many others, has tried Dixon's Motor Chain Compound, and has come to the same result that everyone else will who makes a careful test of this compound. Mr. Heyer's letter is as follows:—

"I have used Dixon's Motor Chain Compound for several years and find that it makes the life of an automobile driving chain last from five to ten thousand miles. I find the proper method of using the compound is to first wash the chain thoroughly in gasolene and then boil it in the compound, then wipe perfectly dry and not use any oil whatever on the chain afterward. The boiling gets the compound into the working parts of the chain where it does its lubricating, while the absence of oil keeps the chain clean instead of collecting dust and grit. Chains should be treated this way at least once every thousand miles. I can recommend Dixon's Motor Chain Compound for use on automobile chains."

ESTABLISHED 1827. DXN TRADE MARK INCORPORATED 1868

JOSEPH DIXON CRUCIBLE CO.,
JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

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26 Victoria St., London. **San Francisco, Cal.**

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GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

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DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., June, 1906.

THE DIXON COMPANY IN PHILADELPHIA.

Dixon's "Anglo-Saxon" pencils have made a "ten-strike" in Philadelphia, and the factory has not been able to fill the orders which Mr. Coane, Manager of Dixon's Philadelphia Branch, has sent in. The Dixon Company were fortunate in selecting a color for this pencil which was at once distinctive and pleasing—a natural green. They are made of a choice quality of lead, fitted with round gilt tops and red erasive rubbers, hexagon shape, stamped in gold, and are packed one dozen in a neck box, six boxes to a carton.

The Dixon Company's Philadelphia office has had for the past week a window display which has attracted considerable attention, and has puzzled those not on the "inside."

There hangs horizontally in the window a huge pencil, suspended only from one end by a small chain, which is placed but a short distance from the end of the pencil. Just above the point at the other end hangs what is apparently a large horseshoe magnet, but it in reality is only an excellent paper imitation. To those looking at the pencil through the window it is puzzling to understand what keeps the point of the pencil suspended, and seeing what they suppose is a magnet hanging above the point, the natural conclusion is that the magnet must attract the point sufficiently to balance the pencil in a horizontal position.

The explanation is this: The entire pencil is made very light, except at the tip end, which is heavily weighted, and it only remains to find the point of balance to keep the pencil in the correct position.

The Philadelphia Stationers' Association owes its organization, in a large degree, to the efforts of William J. Coane, the Philadelphia manager of the Dixon Crucible Company. Mr. Coane has devoted not a little of his time and energy to not only the forming of the Association, but also to active participation in the work after his efforts had met with success and the Association became a live factor in the stationery trade of Philadelphia. That the trade appreciate his efforts is evidenced by the fact that they insist on his remaining an active member. He is certainly a "live one."

—*Geyer's Stationer.*

"NOT FOR PUBLICATION."

In giving the following interesting facts we are obliged to omit the names of man and place, as the information comes to us marked: "Not for Publication." The writer is a chief engineer of a line of public conveyances, and writes as follows:

"I am so satisfied with Dixon's Graphite that I cannot refrain from writing you these few lines. . I have employed your product in two different cases:

"1. I have used Dixon's Motor Chain Compound upon the chains of 68 public conveyances of which I have charge.

"2. I have used Dixon's 687 in the change gear boxes of these vehicles. I have increased the life of the chains which make 120 miles a day by about 17 days; formerly the chains were past their work in six weeks, they now last for two months, and are less worn. The bearings of the change gear boxes work well with Dixon's 687, and are in a wonderfully good condition.

"With regard to the shafts they are polished and show no signs of wear. I cannot too highly recommend your products to all chauffeurs, for I can safely say that after six months of constant usage of Dixon's products that they are wonderfully perfect for all rotating parts of automobiles.

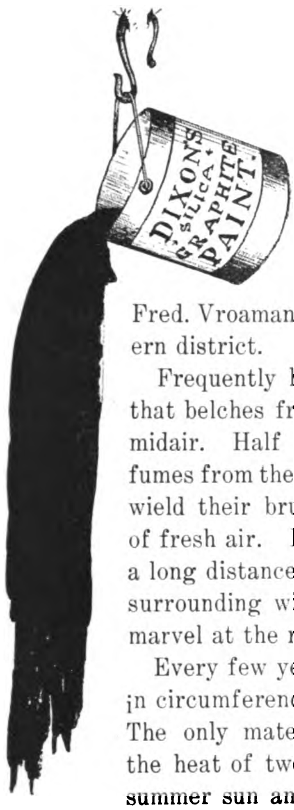
"I beg you to accept the expression of my most distinguished sentiments."

A Master Mechanic of a railroad reports that he has found a new and satisfactory use for graphite. People who have ridden in railroad cars have very likely heard a creaking or cracking noise, especially when rounding curves, due to the car not being thoroughly tight in all of its seams.

The general manager of the road had a car in which a creaking and cracking was an especial annoyance and he sent the car to the Master Mechanic with instructions to cure the trouble at any cost. The Master Mechanic said that it took him seven weeks to rebuild the car and that at any point and at every seam and connection where he thought there would be any friction he thoroughly coated it with graphite. The result was that the general manager complimented him very highly on his success, as the car run absolutely without noise. The matter was discussed at the meeting of Master Mechanics and it is very likely that hereafter this treatment will be largely practiced, certainly it will be on that road.

DIZZY JOBS FOR PAINTERS.

Men Working in Smoke 240 Feet Above Ground on Pumping Station Chimney.



Hanging like flies, says the *Brooklyn Citizen*, from slender ropes 240 feet above the ground, two daring painters are at work painting the big steel chimney of the city pumphouse at Atlantic avenue and Logan street. The venturesome ærialists are William A. Lewis, of 1432 Atlantic avenue and his assistant, Fred. Vroaman, who lives somewhere in the Eastern district.

Frequently half hidden by the cloud of smoke that belches from the chimney, the men hang in midair. Half stifled at times by the gaseous fumes from the twenty fires below, they alternately wield their brushes and dodge back for lungsful of fresh air. People who pass on the streets for a long distance around and those who gaze from surrounding windows at the wind-swayed forms marvel at the rare sight.

Every few years this huge steel stack, fifty feet in circumference at its base, needs a coat of paint. The only material that successfully withstands the heat of twenty furnaces and the heat of the summer sun and the storms of winter is Dixon's Silica-Graphite Paint.

Mr. Lewis is a veteran "steeple jack," whose business it is to paint stacks of all kinds without regard to their height or the danger encountered.

The reporter of the *Brooklyn Citizen* said to Mr. Lewis: "Don't you ever fear a slip or a break?"

"No, I never think of that—the rope won't slip."

"But suppose it did?"

"Well, Mrs. Lewis would collect some life insurance—that's all."

ARTIFICIAL DIAMONDS.

Our readers are already familiar with the experiments of the French chemist Moissan, who was successful in producing artificial diamonds by the employment of molten iron as a solvent for carbon, and using the electric stove, invented by himself, for producing a degree of heat hitherto not reached. Through the intense heat of this electric stove and by sudden cooling of the molten metal, the carbon is separated in the form of very small diamond crystals. The London *Lancet* reports a further step in advance in the production of crystalized carbon through experiments of Dr. Burton, of Cambridge. This scientist has proved that the diamond is a denser form of crystal than graphite, and that a lesser pressure is sufficient for producing artificial diamonds than had been employed heretofore. Dr. Burton in his experiments used a molten alloy of lead and some metallic calcium, which can also hold a small quantity of carbon in solution.

If the calcium is separated from the molten mass, some of the carbon crystallizes. The separation of calcium can, for instance, be accomplished through steam. If the introduction of steam is made during full red heat, then small graphite crystals are found in the resulting crust of lime; if the steam is introduced during a low red heat, no graphite is formed, but a number of microscopical crystals are formed, the properties of which are entirely identical with those of natural diamonds. These experiments, which may be continued, strengthen the belief that it may be possible some day to produce in the laboratory of the chemist diamonds of sufficient size and perfection to compete with natural diamonds.

JUNE ON THE MERRIMAC.

O dwellers in the stately towns,
What come ye out to see?
This common earth, this common sky,
This water flowing free?

As gayly as these kalmia flowers
Your door-yard blossoms spring;
As sweetly as these wild wood birds
Your caged minstrels sing.

You find but common bloom and green,
The rippling river's rune,
The beauty which is everywhere
Beneath the skies of June.

From ceiled rooms, from silent books,
From crowded car and town,
Dear Mother Earth, upon thy lap,
We lay our tired heads down.

Cool, summer wind, our heated brows;
Blue river, through the green
Of clustering pines, refresh the eyes
Which all too much have seen.

For us these pleasant woodland ways
Are thronged with memories old,
Have felt the grasp of friendly hands
And heard love's story told.—WHITTIER.

PRACTICAL GUIDE FOR FIREMEN.

Under the above title Mr. W. H. Wakeman has written a little book which should prove very instructive to firemen. It contains information and suggestions for the care and management of steam boilers, pumps, traps and gauges.

Mr. Wakeman is the author of "Modern Examinations of Steam Engineers," "Engineering Practice and Theory," and many articles for mechanical papers, so that anything from his pen would be looked upon as coming from a thoroughly practical man, and one who has attained the position of a recognized authority through hard work and careful study.

Mr. Wakeman's permanent address is 64 Henry Street, New Haven, Conn.

STEAM TRAPS.

What They Are For and How to Make the Best Use of Them.

We shall publish in GRAPHITE several chapters on the subject of steam traps. These chapters and the illustrations have been prepared for us by Mr. W. H. Wakeman, and as there appears to be very little reliable writing on this subject the articles will be of interest and value to all who have anything to do with steam power plants or with steam heating.

The articles begin in the present issue of GRAPHITE.

DIXON'S graphite publications sent free upon request.

STEAM TRAPS.

By W. H. Wakeman.

Chapter I.

These appliances have proved worthy of adoption wherever steam is used for heating or drying purposes, also where long pipe lines must be employed for conducting steam to engines and pumps, as they save enough in a short time to repay their cost, thus proving a profitable investment.

Some steam users seem to think that a trap is only a luxury to be enjoyed by those who have expensive plants in operation and wish to show many extra appliances which might be dispensed with, and not be missed. This is a great mistake, as a trap is valuable according to the cost of fuel that must be burned to make the steam. Whether the buildings and machinery are well made, or only the cheapest and poorest that can be found, and are kept in repair according to their first cost, thus constituting either a good or a poor plant, has no bearing whatever on the case.

Another point to be considered in this connection, is that while exhaust steam is usually considered a waste product, it is not really so unless it cannot be used for any good purpose. There are scores of plants where exhaust steam is allowed to waste, and live steam is used every day where dry exhaust steam would answer every purpose.

In some of these plants there are no valves for regulating the escape of steam, while in others that are fitted with them

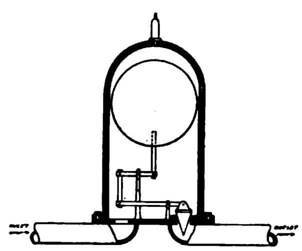


FIG. 1

they are never used. The trap shown in Fig. 1 is suitable for this service, as it is intended for five pounds pressure or less. Water resulting from the condensation of steam enters at the left, filling the body of the trap until the large copper float rises and by means of connecting levers raises the top shaped valve, allowing water but no steam to escape at the right.

Steam cannot escape because there is always some water left in the trap. If it begins to run out faster than it comes in, the float falls and closes the valve at once, thus providing what is called a "water seal" that prevents loss of steam.

Traps may be divided into two general classes, namely: those that discharge constantly and those that must be filled, then are partly or wholly emptied by a dumping action which results in an intermittent discharge. As a rule the former type, to which belongs the specimen shown in Fig. 1, is well suited to light pressure work, and as there is a large space above the float that is never filled with water, it gives an excellent chance for air to separate, and going to the top it is discharged through the air valve shown.

I had a rather interesting experience with a pair of these traps on one occasion, that appears amusing now that it is past. A certain heating system, forming part of the equipment of a large building, failed to work well and was considered a failure, as the pipes were made too small and the returns were too nearly horizontal to drain readily. These traps were fitted with a by pass by means of which hot water could be shunted to the main return pipe without going through the trap, whenever it was necessary from any cause, and in this case they had to be used all of the time, as the traps were not capable of removing this water fast enough to prevent pounding in the pipes.

Now the dome shaped top of each trap is alike on all sides, except where the word "inlet" is cast on the lower part. This was investigated and found on the right side to outward appearance, and still the traps failed to work well. These tops are bolted to the bottom parts as shown, and although the bolt holes were spaced irregularly, giving the idea that they could only be used in one position, still it was possible to give them one-half turn on their bases, and still get the bolts in.

This is exactly what had been carelessly done in the shop where they were made, therefore, although the "inlet" denoted that they were right, they really were put on wrong and of course could not operate as the makers intended. Reversing the botton connections proved a remedy, and they have worked well ever since the change was made.

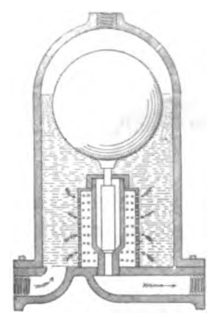


FIG. 2

Fig. 2 illustrates a very similar trap, except that there are no levers used. The valve is operated by direct connection to the float. An extra strainer is provided, because this trap is intended for separators and eliminators from which grease and heavy oils come down.

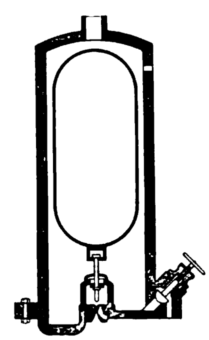


FIG. 3

Fig. 3 illustrates another trap the valve of which is operated by direct connection to the float. The inlet is at the top and the outlet at the bottom, which is proper for places where there is enough "fall" to admit of such an arrangement, but in many cases the inlet and outlet must be nearly on the same level. A blow-off valve is provided for, removing dirty

water without taking the trap apart. The float in this case is not in the form of a sphere, therefore is not as strong as it otherwise would be, but is strong enough for all practical purposes.

Fig. 4 is another trap in which a spherical float is used, but is of very different design from those previously shown. The inlet is at the right hand near the top, but the float is protected from direct action of a stream of incoming

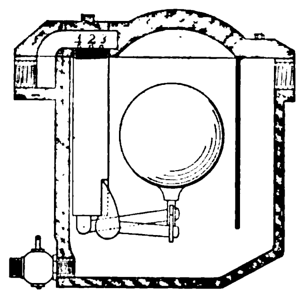


FIG 4.

water, by a baffle plate extending well towards the bottom of trap. As water must always cover the bottom of this baffle plate it forms an effectual water seal to prevent steam from blowing directly into the air, which is a valuable point in any trap, as it assists in keeping heat from going to waste.

As the water level rises the buoyant hollow copper float rises also, and at first it opens the valve marked *2*, which allows some of the water to pass out, but if more comes than this valve can discharge, the float rises higher, the effect of which is to open valve *3*, increasing the capacity. If this is not enough the float rises higher still, opening valve *4*, which gives the full capacity of the inlet, therefore the trap is then working to its full limit.

It will be noted that this trap can be set where there is little head room above it, while others shown must be nearly all above the pipe lines which they drain. In either case, if the trap must be set in close quarters (and some of them are put where there is little chance to work around them), it is a good idea to use a union on each side so that when it is necessary to clean or repair the trap it can be taken down easily and placed on a bench or elsewhere and quickly taken apart, thus saving time and maintaining an even temper.

On nearly every one of these traps that I mention there is a packed joint, and unless care is taken to manage the matter right, this joint is not only a source of annoyance and labor but also an expense, because frequently an inferior packing is used that is torn into shreds when the joint is pried apart.

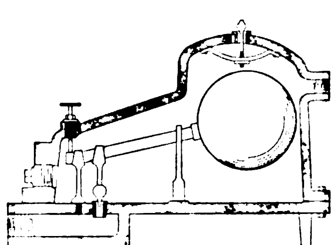


FIG 5

Of course the engineer cannot help this when a trap is new, but the first time he packs it ought to be the end of such trouble. Cut a gasket out of a standard grade of packing, put it on the joint with nothing between them on the lower side, then cover the upper side with Dixon's fine graphite mixed with enough cylinder oil to make a thick paste. Cover it carefully and rub it down until a good, smooth, shining surface is secured. It will take a few minutes to do it, but will be time well spent, for when it is necessary to break that joint again it will come apart easily, and the old gasket can be used without trouble or delay.

Fig. 5 illustrates a trap that can be used under high pressure (which is also true of Fig. 4) as the float is located at the end of a long lever, therefore the valve is moved easily. The inlet is at the upper right hand end, while the outlet is at the lower left hand near the floor.

The hand wheel shown is for the purpose of screwing down the spindle, the end of which bears on the end of float lever, raising it and opening the valve in case it is desired to blow out the trap under pressure. A plug is provided for the purpose of removing sediment that collects around the valve.

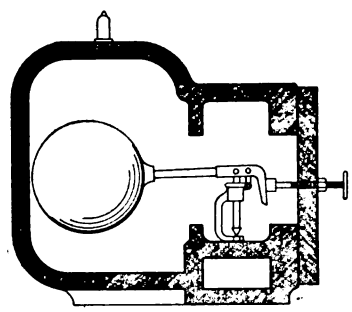


FIG 6

Fig. 6 is a compact form of trap the valve of which is operated by a spherical float, exerting a strong leverage. A hand wheel at the right operates a spindle, the end of which acts as a stop for the curved end of lever, also provides a way for opening the valve to blow out water under pressure. A check nut is provided for locking this spindle in any given position.

(To be Continued.)

P. D. Q. WANT "AD."

Wanted—Right away quick, a brick mason to build a chimney on the Murdock home on Walnut Hill. The owner is tired of living on cold health foods and other kinds of horse feed, and wants to start a fire and fry some bacon and make some real coffee to go with the hardtack.

—Want "Ad." in *Eldorado* (Kan.) *Gazette.*

Everybody in the Chicago trade as well as elsewhere was deeply grieved to hear of the death of Fred. Musson, in Philadelphia. Mr. Musson was one of the best known men in the trade of the country. He started the Chicago office of the Joseph Dixon Crucible Company, and conducted it successfully, leaving the Dixon Company's employ about eleven years ago. Of late years he has been with the Moore Push Pen Company. He was a man of most attractive personality and his loss will be keenly felt. —*American Stationer.*

Wealth is simply a superfluity of things we don't need.

—LINCOLN.

HOT BEARINGS; THE CAUSE AND REMEDY.

One of the troubles in a power plant, according to the *Southern Engineer*, is the heating of bearings on engines and line shafting and oftentimes the cause cannot readily be found. Sometimes the cap nuts are not filled up evenly all around, with the result that one side of the cap cramps the shaft. This is a common occurence, and if no attention is given it a serious accident may result.

When a hot bearing occurs there is always a reason for it. It may be that the shafting is out of line or is not level or there may be a lack of oil. On some lines of shafting there are bearings on which the caps have a large opening and in which is placed some waste.

Before long the waste will fill up with dust, and when more oil is poured in the dust will be worked into the bearing. This invariably results in a hot bearing. Then the engineer or oiler wonders why the bearing runs hot after having run along smoothly for perhaps a long time.

Then again in some bearings grease is used in place of oil, and in some time dust will settle on the grease. When the latter becomes worked into the bearing, the dust will also get in and cause heating. The remedy is to cover the grease.

Change of temperature in an engine room may cause a hot bearing, for when a door or window is opened for a long time it will lower the temperature and cool the oil in the cups. Then they will feed slower or stop altogether. Were this to go unnoticed by the engineer a hot bearing will result.

When a bearing gets hot, shut down if possible, then wash out the bearing with kerosene oil and use graphite mixed with cylinder oil. In some cases the oil is at fault. It may not be adapted to the purpose for which it is used. It may be too light or too heavy. If the oil is too light then again the addition of flake graphite will help matters immensely and prevent heated bearings.

DIXON'S "ORDER-BOOK" is a high grade pencil, manufactured especially for writing in manifold order-books. All who use manifold books will find this pencil invaluable. It is easily worth ten cents of any man's money who uses such books, and if your stationer does not keep them we will send one for ten cents.

GRAPHITE FOR GAS ENGINES.

An automobile owner in Geneva, N. Y., ran a 20 h. p. two-cylinder opposed Brennon gas engine all of the season of 1905, using only Dixon's No. 635 Graphite in the cylinders. No oil whatsoever was used and the results were so satisfactory that he will continue to do the same this season.

Messrs. Metcalf & Miller, experts and dealers in gas and gasoline engines, Quincy, Pa., write us that they have found the use of Dixon's Graphite reduces the friction on their engine pistons to a minimum. They find better results with light oil and flake graphite than if they use a high grade gas engine cylinder oil.

The Williamsport Gas Engine Company, Williamsport, Pa., use Dixon's 635 Special Lubricating Graphite in the lubrication of their gas engines. They also make use of it on gaskets, on valve chambers and cylinder heads, as well as for lubricating the studs on the engine.

A correspondent in Harrisburg, Pa., writes us that he uses Dixon's Graphite for the lubrication of gas engine cylinders. He introduces it to the cylinders by holding some of it in his hand and on the out-stroke of the piston when the engine is drawing in air. He finds this as good a method as mixing with the oil and feeding through oil cups, but he knows that it will not work on all makes of engines.

OLD PROVERBS.

Mr. A. L. Haasis of the Dixon staff, who is a collector of rare books and other things, sends us the following:

Rev. Wm. Scott Downey, in his little book called "Proverbs," published in 1858, says:—

"As the furnace purifies the silver, so does charity rid wealth of its dross."

"Keen adversity is the best crucible in which to try man's integrity."

"Gold is the key to society; but poverty its barrier."

DIXON'S GRAPHITE GREASE IN RAILWAY USE.

The Chief Engineer Recommends it as Superior to the Article in Use.

The agent of a well known railway company writes us that they have made a very satisfactory test of Dixon's No. 5 Cup Grease and that their Chief Engineer recommends it very highly and considers it superior to what they have been using heretofore. He also advises us further that we may look for orders through their regular purchasing agent.

TO KEEP BEARINGS RUNNING SMOOTHLY.

The writer has for years used Dixon Graphite in the crank case of his automobile with excellent results. He has also been in the habit of putting a small quantity of graphite in the compression chamber with good effect upon the piston. We have used merely grades of graphite used for ordinary machinery, but it seems the makers think they can do better for automobilists. They write us:

"We are going to put up a finely pulverized graphite and call it Dixon's Autographite, and a little of this in a man's crank case to the proportion of about a teaspoonful to a quart of oil will do wonders in lubricating the pistons, and I honestly believe makes better compression by filling up, as it does, the minute irregularities in the piston and wall of the cylinder. Then we have graphite cup grease and a first-class grease for gears."

Send to the Joseph Dixon Crucible Co., Jersey City, N. J., for a sample and tell them we advised you to do so.

—*Automobile Magazine.*

A LUBRICANT FOR LATHE CENTERS.

A correspondent of *Machinery* says, an excellent lubricant for lathe centers is made by using one part graphite and four parts tallow, thoroughly mixed.

WETTING LEAD PENCILS.

The act of putting a lead pencil to the tongue to wet it just before writing, which is habitual with many people, is one of the oddities for which it is hard to give any reason, unless it began in the days when pencils were poorer than now, and was continued by example to the next generation. A lead pencil should never be wet. It hardens the lead and ruins the pencil. This fact is known to newspaper men and stenographers. But nearly every one else does wet a pencil before using it. The fact was definitely settled by a newspaper clerk away down East. Being of a mathematical turn of mind, he ascertained by actual count that of 50 persons who came into his office to write an advertisement or a church notice, 49 wet a pencil in their mouths before using it. Now, this clerk always uses the best pencils, cherishing a good one with something of the pride a soldier feels in his gun or his sword, and it hurts his feelings to have his pencils spoiled. But politeness and business considerations require him to lend his pencil scores of times a day. And often, after it had been wet till it was hard and brittle and refused to mark, his feelings would overpower him. Finally he got some cheap pencils and sharpened them, and kept them to lend. The first person who took up the stock pencil was a drayman, whose breath smelt of onions and whiskey. He held the point in his mouth and soaked it several minutes, while he was torturing himself in the effort to write an advertisement for a missing bulldog. Then a sweet-looking young lady came into the office, with kid gloves that buttoned half the length of her arm. She picked up the same old pencil and pressed it to her dainty lips preparatory to writing an advertisement for a lost bracelet. The clerk would have stayed her hand, even at the risk of a box of the best Dixon pencils, but he was too late. And thus that pencil passed from mouth to mouth for a week. It was sucked by people of all ranks and stations, and all degrees of cleanliness and uncleanliness. But 'twere well to forbear. Surely no one who reads this will ever again wet a lead pencil.

AUTOMATIC ADVERTISING.

What we mean by automatic advertising is the making of such goods, and such goods only, as advertise themselves. Like this for instance: A visitor goes through a brass foundry; coming to the crucibles he asks: Whose make do you use? Why, Dixon's, of course, says the brass founder, I have used them for years, and have time and again tried the other makes, but Dixon makes the best crucible. The Dixon crucibles, you see, advertise themselves.

Take the theatre advertisements, they are all of small space in the paper and obscure, but if the play pleases the play-goer he tells of it wherever he goes. How frequently you have heard: Have you seen such and such a play? No. Well, go and see it, it is the best thing now on the boards. It advertises itself, "don't you see?"

This is the principle we work on in making the many Dixon products.

Take Dixon's American Graphite Pencils, for instance. We are satisfied if you buy one with that particular stamp, and buy the particular grade of hardness you like, you would talk about them as the man quoted above talked of the theatre play.

Dixon's Lubricating Graphite is also made on this automatic advertising system. Don't you use it? said a machinist the other day. No. Well, buy a box, don't be without it.

So with the Dixon Motor Greases and Automobile Lubricants, they are absolutely the best of their kind, and preach their own way with the automobile audience.

Everything the Dixon Company makes is supervised by experts; all its materials pass laboratory inspection; outside of our own office we call on the college and university laboratories, and have, for instance, the co-operation of Professor Goss, of Purdue University, who is the best known laboratory expert now in the United States.

This is why Dixon products, crucibles, pencils, lubricants, stand so high, and are recognized as standards, and win by their excellence this automatic advertising.

—JOHN A. WALKER.

NO RISK, NO GAIN.

Full many a ship puts out to sea,
Not knowing what the end may be;
And if each tarried the end to know,
How many ships to sea would go?—*Lippincott's*.

THE DISSOLVING OF GRAPHITE BY MOLTEN COPPER.

H. Moissan, the noted French metallurgist, recently made some experiments on the distillation of copper by means of the electric furnace. He found that the copper could be distilled and condensed in felt-like crystals upon a cold surface. Strange to say, the copper crystals had a less specific gravity than pure copper, which Moissan attributes to the occlusion of hydrogen. The copper which he distilled otherwise had all the properties of metallic copper.

Moissan found that, at its boiling point, copper dissolves graphite, and, upon cooling, the graphite is given out again in the form of more or less well defined crystals. This fact undoubtedly explains why small black specks are occasionally found in the fracture of brass castings. It is probable, however, that unless the copper is very highly heated, graphite is not absorbed by it. At the usual brass melting temperature there is, undoubtedly, little absorption; but in overheated metal it may be possible that the dissolved graphite plays a more important part in weakening copper and its alloys than usually is supposed.—*Brass World.*

WHY MEN FAIL.

Some interesting figures have recently been published in *Bradstreet's*, showing the number of business failures last year in the United States and the causes that brought them about. There were 9,967 failures among the individuals, firms and corporations engaged in mercantile pursuits in the United States, out of 1,352,940 concerns in business, considerably less then one per cent. of the whole, a lower per cent. than has occurred in any year since 1882, except 1900. *Bradstreet's* classifies the causes of failures under eleven heads, and of the eleven "lack of capital" takes the lead as most prolific in inducing failures, and "incompetence" comes next. An encouraging sign is that the number of failures due to fraud was small as compared to other causes.

On the causes the Augusta (Me.) *Kennebec Journal* comments:

"Fraud is one of the constant causes of commercial failures, but it is far from being the principal one. Fraud never can be got rid of, but it does not appear to be making any headway. In 1902 the percentage of failures ascribed to that cause was 10.1. In 1904 it was 8.6, and in 1905 it was 9.2. If any reliance can be placed on percentages the commercial world is not permeated with dishonesty. The public, which has read so much about grafting in high places, in politics, and high finance, may take comfort in the thought that dishonesty is not rife among the average business men of the country. Only four of last year's failures were due to speculation. That does not prove that speculation is rare among men engaged in commercial occupations. Probably there are many of them who are more or less speculative, but only four got caught. If there had been a panic or a sharp depression in values the number of failures due to speculation would have been much larger.

"Incompetence and lack of capital are the chief causes of bankruptcy today, as they have been from the beginning. To them 57.8 per cent. of last year's failures are ascribed. The man who has exceptional business ability can make a start with practically no capital and score a success. Men of only average ability who are handicapped by the lack of adequate capital are likely to go to the wall, even when general commercial conditions are favorable.

"Of the failures of 1905, 2,428 were due to incompetence. Those failures cost creditors $10,000,000, that being the difference between assets and liabilities. The failures due to fraud were less expensive, the loss to creditors being a little over $6,000,000. It is business incapacity rather than dishonesty against which creditors should be on their guard."

—*Public Opinion.*

GRAPHITE FOR GAS ENGINE CYLINDERS.

We have permission to use the following matter, but are not permitted to give our readers the name of the chief engineer who furnished us with the facts.

The chief engineer of a very prominent plant using a large number of gas engines, advises us that he has demonstrated to his entire satisfaction that premature explosions in the gas cylinder are caused by heating of the cylinder or cutting of the piston or packing rings, and that graphite is the best thing he has ever tried to prevent such explosions.

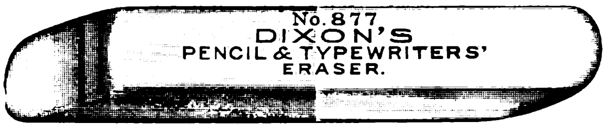
A small quantity of graphite, according to the size of the cylinder of the engine, thrown into the gas main and carried along with the gas into the cylinder will invariably stop the trouble right away.

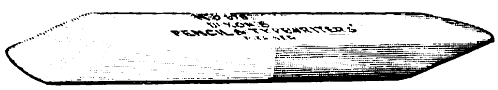
Our correspondent advises us that there are probably hundreds of engineers who have been troubled with premature explosions, and who have never observed that it is due to the cause mentioned, and he believes that if they will try the graphite cure that they will be pleased with the results.

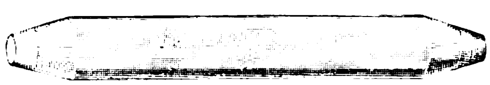
DIXON'S FELT ERASIVE RUBBERS.

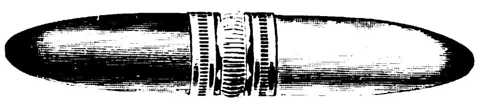
The Dixon Company manufacture a very complete line of erasive rubbers of the highest quality.

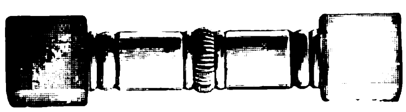
They consist of many different shapes and sizes, such as are needed by the bookkeeper, typewriter, artist and draftsman, and for schools and general desk work.











A special "Finishing Rubber" is also made for the half tone work and general work of the electrotyper.

For quality of material, for design, and for convenience and durability Dixon's Erasive Rubbers may be well recommended, for they are pleasing to all who use them.

CARE OF ELEVATOR ROPES.

"Wire ropes for elevator service," says the *National Engineer*, "are composed generally of six strands with nineteen wires to each strand. This form of construction makes the rope as pliable as if made of hemp.

"The larger the diameter of sheaves and drums the longer the rope will last. As the wear increases with the speed, the speed of the rope should not be greater than is consistent with economy and satisfactory service. A rope should never be coiled in the same manner as is usual with hemp ropes. Always roll the coil on the ground or floor to prevent its kinking or untwisting. Ropes made of galvanized iron wire should not be used as running ropes, because their continual bending over sheaves wears off the galvanizing, leaving the exposed portion open to attack by moisture.

"Where service conditions are such that wire rope is exposed to dampness, or is in contact with water, it should be treated with some kind of preservative. One of these preservatives consists of lime and pine tar, applied hot, in a proportion of one of lime to five of tar, as a mixture; to give the mixture a better body, a little fine sawdust may be added. For ordinary service a dope may be made of linseed oil and tar, or a mixture of cylinder oil, tallow and graphite; all of which should be applied hot."

The wear of wire ropes is both external and internal; the internal is caused by the rubbing of the wires and strands upon each other under pressure in bending over the sheaves, and the external is caused by rubbing and wedging in the grooves of the pulleys.

The wear is often very rapid, particularly if the rope runs over too small sheaves or with too many bends. Rust and dirt hasten natural wear.

Dixon's Graphite Grease has been used very largely by hotel men, owners of office buildings and factories and all others interested in the best possible preservative and lubricant of wire cables. The graphite is carried in among the strands, and by its lubricating qualities prevents abrasion and wear. Graphite is one of the best rust preventives known.

JOHN DEWAR ON PREPARED PAINTS.

Mr. John Dewar, of Pittsburg, is not only an ex-president of the International Association of Master House Painters and Decorators, but is also one of the most intelligent and most successful painters in the United States. His firm executes important work all over the country, and there is probably no other painter to whose judgment and discretion so many large corporations are willing to entrust their work without restrictions. Mr. Dewar writes in the *Canadian Painter and Decorator:*

"My personal experience with 'ready-mixed paints' has been very limited. Yet from that experience and observation I have no hesitancy in saying it is my opinion that they have come to stay, and in some sections they are really a necessity. It is true the average painters are prejudiced against it, as taking from them what rightfully belongs to the craft, the manipulating and mixing of their own colors; but has not that applied in the past to many of the articles entering into our business, of which today we are glad to avail ourselves, taking the manufacturers' word as to their purity and fitness; judging also as to their worth by results produced? Old prejudices are too often stumbling blocks to active progressive men of today. It is true we have various manufacturers as we have various master painters, but I am glad to know that the great majority strive for results, their aim and object being the best possible. To produce that we must of a necessity eliminate as far as possible the 'cheap ready-mixed paints' as well as the master painter whose object appears to be 'how cheap can I buy my material,' without regard to quality, the same spirit predominating in applying it. We must realize the fact that the manufacturers as a rule are in business to cater to the demands of the trade, but what I do strenuously object to is the spurious mixtures put up by unprincipled manufacturers and labeled 'pure goods.'

"I believe the up-to-date manufacturer occupies as good a position as the progressive master painter of today in determining the true value of mixed paint. They call to their aid the best chemists in their line to determine both quality and quantity of the different parts entering into the product, thereby enlisting the aid of science as well as art. You will, I am sure, agree with me that in the matter of thorough mixing, the mechanical mixer is an improvement over the apprentice and the paddle. The writer a few years ago had a large job in New York. When the question of exterior painting was up, the owner requested that I use a 'ready-mixed paint.' I demurred somewhat, as I was very much interested in the general results of the work, but after being given to understand that I would not be responsible for it, I ordered three barrels and used it on a residence, watching its application closely. I had to acknowledge the merit, and when looking the work over a year afterward I would have felt perfectly satisfied to have acknowledged it as the work of my own mixing. It all resolves itself into getting the best from the most reputable maker and in applying it in an intelligent manner."

—*Drugs, Oils and Paints.*

Dixon's Silica-Graphite Paint has the confidence and endorsement of practical painters, owing to the fact that it has been manufactured for over forty years in but one quality—the highest standard, with our guarantee of correct proportions of the best pigments and linseed oil that can be used in paint making.

We daily lose orders for a large amount of paint business by reason of the fact that we will not manufacture cheaper qualities and different colors.

Dixon's Silica-Graphite Paint is made in the four standard colors: olive green, dark red, natural and black. The natural flake graphite pigment is a silvery gray, and coloring pigments, other than those we use, shorten the life of the paint. The foundation of our paint business is durability. The painter and owner are at all times protected in the use of Dixon's Silica-Graphite Paint, as every feature in the manufacture of this product is so carefully directed that it is the perfection of mixture and quality.

The Dixon paint literature is attractive, interesting and convincing. Write to-day for a copy of the folder "Colors and Specifications," containing practical suggestions for construction and maintenance painting of all classes of metal construction.

HAVE YOU AN AUTOMOBILE?

If you are the owner of an automobile, or if you are interested in an automobile, then you should bear in mind the well known fact that Dixon's Flake Graphite is needed for the best work of the machine.

If you are overhauling your engines and have the heads off, don't neglect polishing the cylinder walls with Dixon's No. 635 Graphite. It will insure better lubrication and better compression.

Fill your grease cups with Dixon's Graphite Cup Grease. This grease is made in several degrees of hardness—according to the amount of heat to which it is subjected.

If you have any metaline bearings—and some machines have—then you should use Dixon's Dry Graphite, No. 635, on them, and no oil whatever.

If your machine has any fibre pinions or gears—and many machines have—then make a stiff paste of cylinder oil and Dixon's No. 635 Graphite and apply. The result will please you as it has so many others.

For your gears, in transmission box, use Dixon's 687 Graphite Grease. It is used largely both in the United States and abroad and with fine results.

Dixon's Flake Graphite, in one form or another, is almost as necessary to an automobile as gasoline itself.

QUEER STOVE POLISH.

Port Jervis Woman Badly Burned by an Explosion.

Mrs. Irving Clark, of Port Jervis, was engaged in blacking her kitchen stove Monday forenoon with some sort of new-fangled patented stove polish, when the stuff exploded with a loud noise, setting fire to the woman's clothing. Half frantic with fear, she grabbed up her seven-month's old son and ran shrieking to the street.

Neighbors seeing her plight ran to her assistance and succeeded in extinguishing the flames, but not until she had been badly burnt about the breast, arms and face. Her infant's head was also badly scorched. Dr. E. B. Lambert made them as comfortable as possible and thinks they will both recover. An analysis of the stove polish revealed the fact that one of its ingredients is gasoline—rather of a strange fluid to be used around stoves.

This is the third burning accident around Port Jervis within a few weeks, one of which has resulted fatally.

—*Middletown* (N. Y.) *Times and Press.*

The market is flooded with "queer," worthless and dangerous stove polishes. The Dixon Company have absolutely refused to make the gasoline or turpentine polishes. Incidentally it may be well to remember that one cake of the old fashion Dixon's "Carburet of Iron" Stove Polish contains as much polishing material as five or six packages of the paste or liquid polishes, to say nothing of the quality.

DIXON'S POT LEAD.

And What a Prominent Foreign Yachtsman Thinks of It.

A representative of the Dixon Company at Copenhagen writes us as follows:—

"One of our largest land owners, Baron Reedtz Thott, has tried your Pot Lead on his yacht "Vanity", and he personally told me during a visit that he was very well satisfied with it; I therefore asked him to give me a testimonial, and he wrote me as follows, which I give you in Danish and English language:

"Det er mig en Glaede at meddele Dem, at jeg har brugt Deres Dixons Pot Lead til min Lystyacht "Vanity" og har vaeret tilfreds me Resultatet, saaledes at jeg kan anbefale dette Materiale."

"I am glad to inform you that I have used your Dixon's Pot Lead for my pleasure yacht "Vanity" and have been satisfied with the result, so that I can recommend this material."

216 W. 28th Street, Los Angeles, Cal.

Your Dixon's 'Eterno' No. 2050 was duly received and I will say thus far it has proved to be the best pencil of the kind, I have ever used, and I have used many.

W. R. Gilson.

ALL ABOUT A GOOD PENCIL.

Now and then we take a visiting customer, or a school official through the pencil factory, and the consensus of expression after going through is, what a marvel! how picturesque! how interesting! I didn't dream that a pencil went through so many difficult processes!

One quick-witted lady who the day before had seen the New York Hippodrome, said it was better to see than two Hippodromes.

The materials come from the very ends of the country.

The Dixon Graphite Mines are in northern New York State, and their cedar plant and possessions are in South Florida. One day in winter of 1904–5, the mercury at the mines was 44° below, and at the cedar plant 68° above.

In the lead making the lead works its way through over 40 processes. The cleanliness equals that necessary for surgical tools. Here is the raw stock, then the powdering, the washing, the drying, the re-washing, the blending, the mixing, the drying, the kneading, the shaping, the air-drying system, the regulating the grades, the diameters, the sizes, the shapes, the baking in the kiln, the testing, in brief it is marvellous.

Then in the wood-working building is the raw cedar, the selection, the assorting, the grooving, the shaping, the gluing, putting in the leads, the varnishing, the polishing, the stamping, the tipping, the end cutting, all done by machinery, all done automatically, by difficult, painstaking processes.

Then you see the rubber department, the nickel-tip department, each with 20 processes, each done by machinery, each done rapidly, but each marvelously exact.

All this explains why a pencil is important. It has come to its present estate by thinking, good thinking, hard thinking; its making is difficult; it takes some three months to make a pencil from start to finish.

We stamp our standard fine pencils "Dixon's American Graphite," and we give a cut below. If you wish a delicious, lovely pencil, buy a dozen with this stamp; you will get the wood varnished like black walnut and smooth as glass. The stamp is made with gold leaf, the lead is smooth like velvet or silk, its mark is clear, black, smooth, deliciously agreeable; so we say: ask your stationer for a pencil stamped in gold, with this particular stamp: Dixon's American Graphite (S. M., for No. 2 grade), and you will bless the day when you made its acquaintance. Try it and see, the stationers all have them.—John A. Walker.

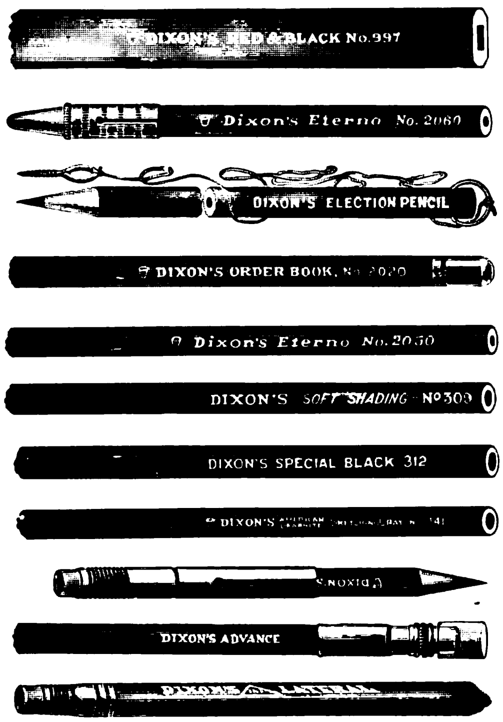
THE SALESMAN'S CREED.

"I believe in the goods I am selling, in the firm I am working for and in my ability to get 'results.' I believe that honest goods can be sold to honest men by honest methods. I believe in working, not waiting, in laughing, not weeping, in boosting not knocking and in the pleasure of selling goods. I believe that a man gets what he goes after, that one order to-day is worth two orders to-morrow and that no man is down-and-out until he has lost faith in himself. I believe in to-day and the work I am doing, in to-morrow and the work I hope to do and in the sure reward which the future holds. I believe in courtesy, in kindness, in generosity, in good cheer, in friendship and honest competition. I believe there is an order somewhere for every man ready to take one. I believe I'm ready—right now!—Edwin Osgood Grover, in *My Business Friend.*

Dixon's graphite publications sent free upon request.

THERE IS A "DIXON" PENCIL FOR EVERYBODY.

There is a "Dixon" Pencil that will Exactly Suit for any Kind of Pencil Work to be Done.



The above illustrations give a faint idea of the thousand and more kinds made by the Dixon Company, but "Dixon's Pencil Guide for Pencil Users" will help you greatly in selecting the proper pencil for your work. It is sent free of charge.

IN 3505 A. D.

First Airship Owner—Have any trouble in reaching Mars?

Second Airship Owner—None worth mentioning. I was fined four or five times for scorching on the Milky Way and once for looping the loop on one of Saturn's rings, but that was all. —*Grand Union Herald.*

The engineer of a large mine in Arizona, whose name we are not permitted to add to this article, writes us as follows:

"The sample of Dixon's No. 635 Special Graphite was received and tried on a 15 horse-power gas engine.

"I have been running for over three months one 15 horse power and one 42 horse-power Fairbanks-Morse gas engines, using Dixon's 635 Special, which I ordered from our regular engineer supply store in Prescott. Both engines are running very smoothly. I use less cylinder oil, and both engines are taking less explosions and hence save considerable distillate.

"I am also making use of Dixon's regular flake graphite and Dixon's Graphite Pipe Joint Compound.

"Three weeks ago I put in the mine eighteen feet of pipe line for compressed air, using Dixon's Pipe Joint Compound. There was not a single leak."

Augusta, Me.

I received the 'Eterno' pencil this morning and have tried it with several kinds of copying pencils, but find the 'Eterno' to be the best I ever used for copying and general purposes.

C. W. CONANT, Shaw Business College.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Metal Workers' Crayons.

Dixon's Felt Erasive Rubber, for erasing pencil marks, typewriter work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite,

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Graphite for Type Setting Machines.

Dixon's Graphite for Talking Machines.

Dixon's Motor Chain Compound, for transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for leather belts.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

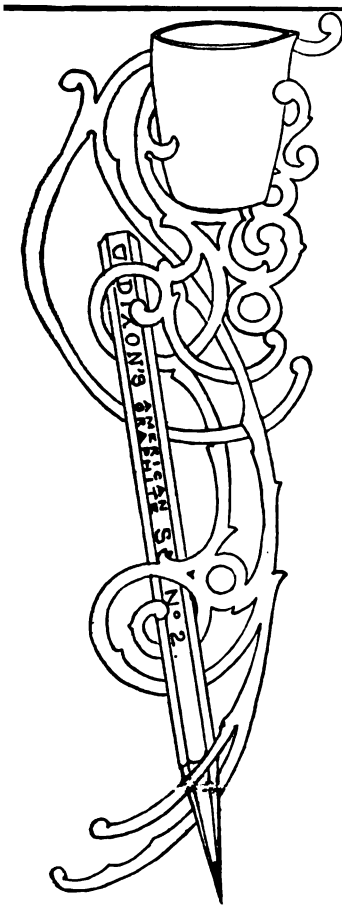
Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Brushes, for motors, dynamos and generators.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

Graphite.



VOL. VIII. JULY, 1906. No. 7.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

THE ENGINEER CONSIDERED.

An engineer had been using Dixon's Flake Graphite for many years and had gotten so wedded to the habit of having it around he simply could not do without it. He once said to the writer: "Everything that sticks, squeaks or runs hard I dose with Dixon's Flake Graphite and the cure is certain every time." He mixed it with cylinder oil into a rather stiff paste and used it on all threaded joints, he used it on his flanges, he used it in his engine cylinders and he used it as a paint in the steam space of his mud drums.

One day there was a change in the appearance of the graphite furnished him, the flakes seemed less uniform, and lacked the lustre of the old time flake graphite. It did not seem to be the real stuff yet it seemed to work all right, and he couldn't find any particular fault. Finally he noticed that he seemed to use more of it, it didn't seem to go so far, then he made inquiry and the boss told him that it wasn't Dixon's, but that it was just as good and that it cost about 16% less money and that in these times of economizing that was an item to be considered, especially as they used quite a quantity.

The engineer wanted to be economical, but he thought he would make a comparison and see if it was really more economical to use the cheaper stuff. He bought a package of Dixon's and he took a tin can and filled it with the Dixon Flake Graphite and had it weighed by a nearby druggist. Then he returned, emptied it out and filled the can with the substitute graphite and went back to the druggist and had him weigh that. The result was that the can held 8¾ ounces of the Dixon Flake Graphite and 12¼ ounces of the substitute graphite.

On figuring it out he found that the Dixon Flake Graphite was 40% more in bulk and therefore far more economical to use than the substitute, which was being bought at 16% less money.

His demonstration was so complete that his boss thanked him, and the engineer now has the satisfaction of using the old time reliable Dixon's Flake Graphite, and of knowing at the same time that he is saving money for his company by the use of Dixon's.

If our good friend the engineer had desired to carry the demonstration even further he would have found that the "as good as Dixon's" graphite at 10 cents per pound was really 18% higher in price than the genuine Dixon at 12 cents per pound. And that Dixon's was really worth 14 cents per pound if the "as good as Dixon's" was worth 10 cents per pound. This on the question of price alone; time and the machinery, probably, would have demonstrated a far less value for the "as good as Dixon's."

COST OF POOR LUBRICATION.

The *Southern Engineer* in a very excellent article on "Cylinder Lubrication" mentions a certain engine builder who was an advocate of the practice of using no oil in the valves and cylinders of engines. He installed an engine in a neighboring plant, taking care that no oil or grease be used in tapping or boring, claiming that if there never was any oil or grease used in the pores of the iron, the condensation of the steam would adhere to the metal. Consequently no holes were drilled in the steam pipe of the engine whereby oil could be introduced. The engine was in use for a number of years, and during this time the cylinder head was removed frequently for examination. At no time could any perceptible wear be detected by the use of calipers and straight edge, either in the valve or the cylinder.

This test should convince any fair-minded person that it is not absolutely necessary to use a lubricant in a properly constructed engine. To offset this very desirable showing is the fact that it was shown from indicator cards that the coal consumption was enormous. After several years run under the above conditions, a lubricator was attached to the engine. Since then it has shown a saving of ⅓ pounds of coal per horse-power per hour. When a poor quality, or no lubricant at all is used, there is unnecessary friction, oftentimes as high as 15% of the full power of the engine. This causes much undue strain on the working parts, and a greater consumption of fuel.

Where (in certain plants and steamships) it is advisable to use the water over again and the use of oil is prohibited for good and sufficient reasons, Dixon's Flake Graphite is recommended for engine cylinders for the reason that it is the best solid lubricant known to theory or practice. The thin flakes of graphite fill up the microscopical irregularities of the surfaces and establish a high degree of lubrication which will show a saving in the coal pile quite as clearly as the case mentioned above demonstrated a loss in the coal pile.

DIXON'S graphite publications sent free upon request.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago and Blacklead.

BRANCHES AT

68 Reade St., New York. **1020 Arch St., Philadelphia.**
26 Victoria St., London. **San Francisco, Cal.**

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* JOHN A. WALKER, *Vice Pres. and Treas.* GEO. E. LONG, *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., July, 1906.

WILLIAM A. HOUSTEN.

When the Dixon Company first began the manufacture of "American Graphite" lead pencils, there was born in the city of Baltimore a most promising youngster, surnamed Housten. Today Mr. William A. Housten is 35 years of age, and for over six years has been identified with the Joseph Dixon Crucible Co.

Mr. Housten is married and resides with his wife in the city that gave him birth, having an office at 1005 Union Trust Building.

Mr. Housten has the difficult task of representing the Dixon Company in the full line of its graphite products throughout the territory of Maryland, Virginia and West Virginia.

While Mr. Housten has "made good" in all lines, he has been particularly successful in having Dixon's Silica-Graphite paint used on important steel and iron structures in his territory.

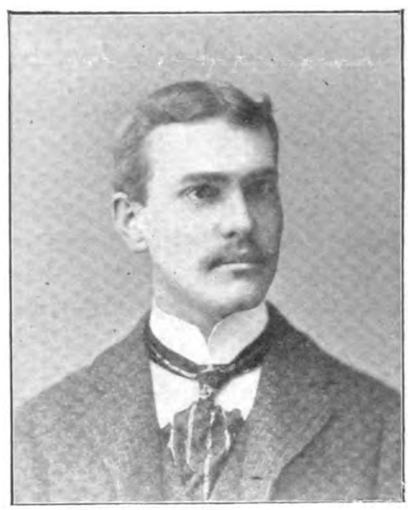
He is well known among school people and educators, frequently lending valuable assistance to the Educational Department of the Dixon Company at School and Drawing Teachers' Conventions outside of his own territory.

Mr. Housten is a hard and very conscientious worker, and while he is too busy to belong to any club or society, he is nevertheless a popular man among his trade, and of a very sociable disposition.

Mr. Housten has a well deserved reputation as a singer, as he has a tenor voice of fine quality and power. For a number of years he occupied a position in one of the best church choirs in the city of Baltimore.

Mr. Housten is further credited with being an excellent raconteur and an agreeable companion generally.

HE IS A BENEDICT.



All the members of the Dixon staff and the trade generally throughout the territory bordering on Chicago and the Great Lakes, will recognize in the face above that of the genial "Billy" Allen, who has represented the Dixon Company practically since he was a boy.

Mr. Allen is now a man of thirty-three years, but he is still "Billy" Allen to all of his friends.

There was no need for him to feel at all lonesome, as his pleasant appearance, nice manner, and high character gave him the entrée to many a home among his customers. Possibly, however, it was seeing these cosy homes throughout his territory, that made him feel as though he wanted one of his own. At any rate, "Billy" Allen was married in Brooklyn, on the evening of June 6th, and in the name of the Dixon staff, one and all, GRAPHITE wishes him a long and happy voyage over the matrimonial sea.

"IT MIGHT HAVE BEEN."

By Nixon Waterman.

The sun went down on a lurid cloud,
  The wind breathed a low harsh sigh,
And a strange weird veil, like a somber shroud,
  Hung down from the murky sky.
The dogs bayed loud at the ghastly moon
  That glimmered a dim sad light,
And the crickets fiddled a doleful tune
  To the ghosts abroad that night.

It was such a night as brave men hate,
  When the darkness fails to hide
The grewsome shapes that congregate
  Or through the shadows glide.
No star to point the traveler home,
  No grace on land or sea;
A night when goblin, witch and gnome
  Hold fiendish revelry.

Through the gloomy gulch by the haunted mill
  That stands like a specter white,
With its broken arms so gaunt and still,
  A footman passed that night.
He trudged along till from without
  The darkness stood a man;
But the footman did not faint or shout,
  He neither turned nor ran.

For come what would in the bitter end,
  He chose to stand and dare,
Till the shadow spoke and said: "My friend,
  Have you got a match to spare?"
The match was given, each went his way,
  There was neither death nor din;
But I've often thought, alackaday!
  How sad it might have been.

ENVOY.

P. S. Good optimists agree
  That through life's thick and thin
It's seldom a thing turns out to be
  As sad as it might have been.

—*Sunday Magazine.*

A few weeks ago a blind young man from the Batavia School for the Blind applied for admission to the Central High School. It was thought, at first, that he would be in the way and need special attention. He was well able to take care of himself, however, and instead of being a hindrance, he was a positive inspiration to teachers and fellow-pupils. He used special books for the blind, and not only kept up his lessons in English and Latin, but expounded his ideas with great clearness and vigor. With infinite patience he acquired such an insight into the beauties of English literature, as not one out of one hundred high school pupils will ever get. He reads Latin with ease, understands Geometry and Physics, and speaks hopefully of the time when he can take up French and German, and so perfect himself for the position of teacher of modern languages. He can make brooms, and goes about in vacation and sells them,—sells them to persons who actually need brooms and not to any one who betrays the least sign that she is doing it out of compassion. He says he wants no favors; only a "fair chance" to earn his living. When the Batavia school reopened a short time ago, he returned to that institution, and he left behind him at the Central the memory of a brave soul, a cheerful heart, a smiling countenance, and an uncomplaining spirit. The silent lesson which this blind boy taught to almost a thousand more or less thoughtless students, endowed with all their faculties,—that lesson almost justifies the cruel handicap, and clothes the sightless boy with a Christ-like dignity.—Frederick A. Vogt, in *Ourselves.*

TALKING MACHINE GRAPHITE.

The above illustration will show the manner in which the Dixon Company puts up its Special Graphite, No. 635, for lubricating the springs of talking machines, clocks, and all instruments using power springs.

The use of Dixon's Special Graphite, No. 635, prevents sticking and binding of the spring and insures smooth and steady action.

To the talking machine this means perfect vocalization, if the records are properly made.

To the clock it means more correct time, and to all machines it means full power of the spring.

DIXON'S GRAPHITE CURVE GREASE.

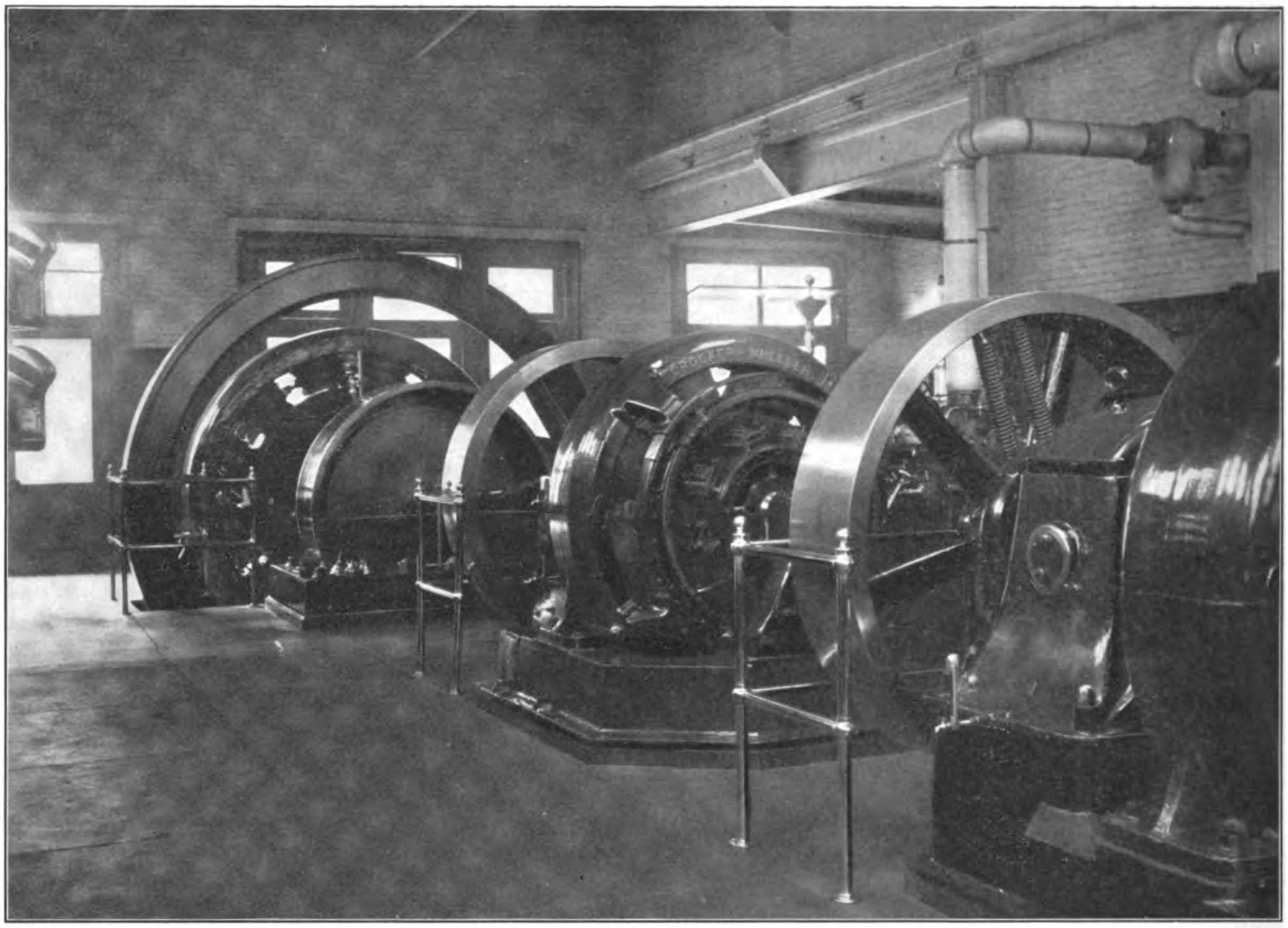
For Centre Plates and Side Bearings of Railway Trucks.

For a number of years the Joseph Dixon Crucible Company have been manufacturing a grade of graphite grease for curves of electric railway trucks.

Some observing man considered that this particular grease would be especially useful on the centre plates and side bearings of railway trucks. After a very thorough trial the grease was found particularly suitable, and in a letter just received from an official of a prominent railroad the following statement is made:

"I wish to state that it takes about one pound of Dixon's Graphite Grease to lubricate a car, that is, two centre plates and four side bearings, and it is applied with a wooden paddle."

This gives the quantity required and method of application, and it is almost unnecessary to add for those who are familiar with the endurance of flake graphite, that this graphite grease is the most durable and economical grease that railway companies can make use of for this particular purpose.



THE DIXON ENGINE ROOM.

An interesting and pleasing view is herewith shown of the main portion of the Dixon engine room.

The equipment shown consists of a Ball engine, in the foreground, running 250 revolutions per minute, carrying a 100 K. W. generator of 250 volts.

The middle engine is a Fischer engine, running 250 revolutions per minute, carrying a 100 K. W. generator of 250 volts.

The third engine is an Allis-Chalmers, running 100 revolutions per minute and carrying a 300 K. W. generator of 250 volts.

The generators are direct current, Crocker-Wheeler machines, with a total rated capacity of 2,000 ampères.

These generators furnish light and power for the entire plant with the exception of the crucible works, which has its old-time Corliss engine equipment for its power.

Charles Haynes Haswell, probably the oldest living engineer and author, has just celebrated his ninety-seventh birthday. Mr. Haswell takes a keen interest in all recent developments in science and engineering and brings up to date each new edition of his "Mechanics and Engineers' Pocketbook," first published in 1842. The continuous reprinting of this standard reference work has already worn out three sets of plates and the book is in its seventieth edition. About ten years ago Mr. Haswell published his memoirs, "Reminiscences of an Octogenarian," a book of interesting recollections of famous people.—*N. Y. Sun*, June 6.

In April GRAPHITE we had quite an article on the life and career of this remarkable man.

REMOVING SPARK PLUGS.

When sparking plugs are fitted into the cylinder in such a way that a "box spanner" is necessary for their removal care should be taken not to let the tool touch the metal tip at the end of the porcelain or the porcelain itself. If it pinches either of these, even lightly, the porcelain will crack. Sometimes plugs are so tightly set that great effort is required to unscrew them. If a little of a mixture of powdered graphite and grease is rubbed on the threads before setting the plug this trouble will be avoided, by reason of it not being necessary with the threads so treated to screw the plug in so hard. Graphite is a good conductor, however, and one should be careful in smearing the threads not to cause a short circuit by leaving some of it on the porcelain non-conductor jacket.—*New York Sun*.

LUBRICANT FOR THE V'S OF LARGE PLANERS.

When very heavy work is to be done on a planer it may happen that the oil or other lubricant used on the ways of the planer does not possess sufficient "body" to resist the pressure and the wearing surface will be cut or badly "roughed up." The writer had a case wherein the planer table weighed eleven tons and the load to be put upon it thirteen tons, making twenty-four tons in all. The bearing surfaces of the V's appeared very narrow to successfully support such a weight. To avoid cutting, the surfaces were lubricated with a mixture of one gallon of "Vacuum" cylinder oil and one pound of Dixon's Flake Graphite. The planing job was easily and successfully done with no injury to the wearing surfaces.—OSCAR E. PERRIGO in *Machinery*.

STEAM TRAPS.

By W. H. Wakeman.

Chapter II.

Illustrations and explanations given in the preceding chapter show that a steam trap is a device for opening a valve to let water escape from a heating system of some kind, also for closing it when steam attempts to escape. Steam users can be found who have given this matter so little intelligent attention that they claim it is useless to provide such an appliance in their case, as a valve can be put on each drip pipe and if the engineer is careful about giving these valves the required opening and no more, it will answer any purpose.

It is not claimed that this is impossible, as it can be done, but it never pays, because a man could not properly care for more than two or three outlet pipes. If he attempted to care for more of them or tried to do other work also, water would collect in the pipes, or else steam would blow out more than it ought to. If the amount of condensation coming to a drip valve was the same all day, the matter would be much more simple, but it is constantly changing, therefore it requires automatic regulation and nothing else will answer the purpose.

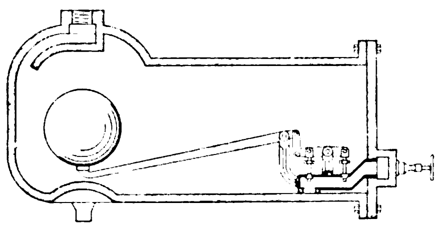


FIG 7

Fig. 7 shows a trap that is fitted with a long lever operated by a float in the usual way, except that the leverage is great, consequently the valves will be easily handled even when operating on a high pressure line.

It will be noted that there are two valves operated by an auxiliary lever that is pivoted centrally between them. One of these moves downward to open, while the other moves upward to secure the same result, therefore if pressure causes resistance to opening one it is counterbalanced by opposite action on the other.

The inlet of this trap is directly over the float, which would naturally cause the incoming water to force the float downward. To overcome this objection a curved deflector is provided, thus shielding the float completely.

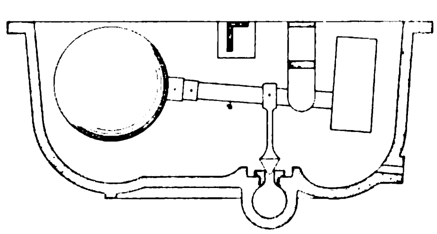


FIG 8

Fig. 8 represents a trap in which the weight of float and its lever is counterbalanced, thus rendering it more sensitive to the effect of water entering to raise the float, open the valve, and discharge water.

While a hollow copper float is light and buoyant, thus rising quickly with the water level, there is always more or less danger of collapse under very high pressures. Even if a float does not collapse, water may slowly work into it until it becomes so heavy that it will no longer float but will sink as low as possible, thus rendering it entirely useless.

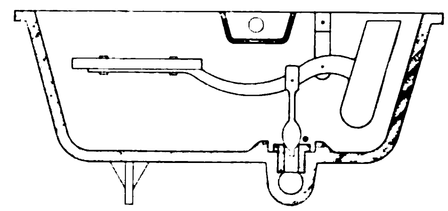


FIG 9

Fig. 9 illustrates a trap in which there is no copper float, making it entirely free from the above objection. The counterbalanced lever and valve are moved by means of a soapstone float, that cannot collapse or fill with water. However, the absence of a float does not necessarily mean that every trap so designed is intended for a very high steam pressure, as there are other points to be taken into consideration.

Every trap is sold on a guarantee to discharge the water of condensation coming from a stated number of square feet of radiating surface, although for sake of convenience the capacity of each may be stated in linear feet of one inch pipe. In all such cases the steam pressure must be known, because water travels through a given pipe according to the head of water above it in hydraulic work, which is represented by the steam pressure behind it in heating work.

From this it will be plain that if a given quantity of water must be disposed of for each hour that the plant is in operation, the inlet and outlet of the trap that is to discharge it must be proportioned accordingly. It does not matter so much about the size of the trap itself, as that is only an incident in the transaction, for although a large bowl or body would take more water to start with, still there would be no further advantage to it; because it must then be discharged as fast as it is received, regardless of the capacity of trap so far as simply holding water is concerned.

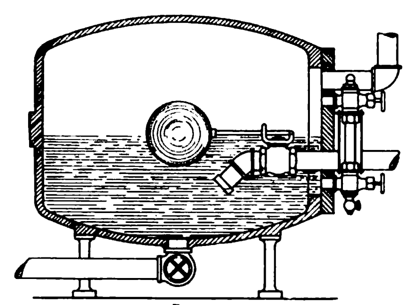


FIG 10

When this fact is taken into consideration it will be plain to prospective purchasers that the size or bulk of a trap has no bearing whatever on its real capacity, which must be rated according to the quantity of water that it discharges per hour.

Furthermore, when a trap is guaranteed to discharge the water coming from, say, 10,000 feet of one inch pipe, it is not so definite a statement as appears on the surface, for under some conditions a given amount of surface will radiate

much more heat than under others. If 10,000 feet of one inch pipe are located in a well built brick building, a certain amount of water will return from them, but if the same pipes are put into a worn out wooden building full of cracks and breaks, the condensation will be more, and if the same pipes are subjected to the action of air forced into rapid circulation by a blower, the condensation may be five times as much as in the first case mentioned.

To illustrate this I may mention a case where the superintendent of a shop ordered a trap that was listed to discharge the water coming from a given number of linear feet of pipe. The amount of radiating surface was well within the limits designated, but when the trap was put into service it could not keep the pipes free from water, therefore it was pronounced a failure. Impartial investigation showed that air was forced to circulate around these pipes by a blower, therefore a very much larger trap was required to do the work. Such experiences should cause engineers to thoroughly investigate failures of every kind before condemning apparatus or appliances which may work perfectly when used under conditions for which they were designed and made.

Fig. 10 represents a trap in which water is received through a pipe in the upper part of the removable head, and is discharged through a similar pipe below it. This pipe is fitted with a balanced valve that is opened and closed by a float connected to a lever. The end of this pipe is several inches above the bottom of bowl, so that sediment is not readily taken up by it.

Steam pressure acting on the surface of water in the trap, forces it out through the balanced valve as soon as the water level is high enough to raise the float, but when it falls a few inches this valve is closed again, while the end of pipe is still under water, making it impossible for steam to escape. A blow-off valve is located at the lowest part, and the whole bottom of the trap inclines towards this outlet, causing sediment to naturally work in that direction until blown into the sewer.

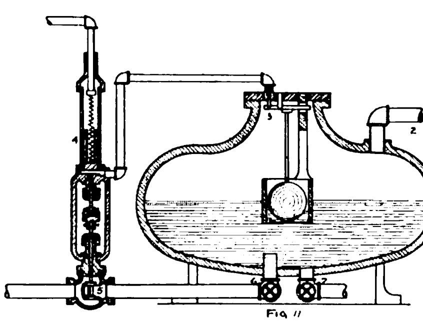


Fig. 11 illustrates a trap that is somewhat complicated, but when used on high pressure work it should give excellent results. It operates as follows: Hot water enters through the large upper pipe *2*, and falling to the bottom rises until the float is lifted by it. This opens a needle valve *3*, which admits steam to the lower part of cylinder *4*, containing a piston as shown. Pressure accumulates under this piston and raises it against resistance offered by the spring. By means of a suitable rod which is partially shown, this piston raises the valve *5*, and as the valve *6* is open whenever the trap is in operation, steam pressure acting on the water forces it out through *5* and *6* to the sewer, or to a receiver if it is to be used again.

Lowering the water level brings the float down and this in turn closes the valve *3*, shutting off steam from the cylinder *4*, therefore the spring forces the piston downward, closing *5* and preventing escape of steam. The valve *7* is for blowing mud out of the bowl.

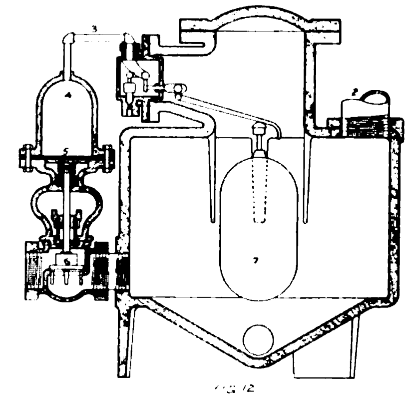
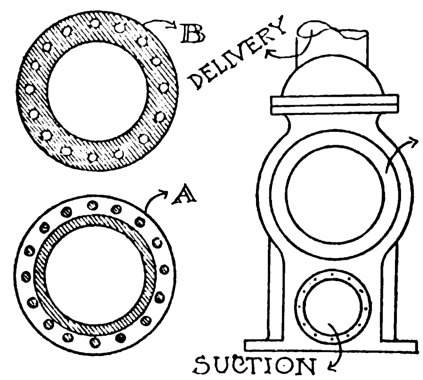


Fig. 12 illustrates an ingeniously contrived trap for high pressure work, the operation of which is as follows: Steam mixed with water of condensation enters at *2*, the water falling to the bottom while steam fills the whole upper part, going out through the small pipe *3* into the dome *4*, the bottom of which is fitted with a diaphragm *5*, which is depressed by the pressure, thus holding the valve *6* to its seat so long as the float *7* remains in its present position.



As water collects in the trap, *7* rises and by means of suitable levers shown, shuts steam off from *3*, and at the same time opens a small free outlet valve that exhausts all steam remaining in *4*, consequently when pressure acts on the bottom of *6* it is raised from its seat, allowing water to be forced out of the trap very rapidly.

With some of the traps shown in this chapter, it is necessary to remove some of the connecting pipes in order to clean the internal parts. Where pipe-joints are "made up" with red lead it is difficult or impossible to break them without crushing the pipe or breaking it off, making it necessary to remove the broken pieces with a cold chisel, but if these pipe threads are thoroughly treated with Dixon's Graphite properly prepared for the purpose, they can be taken out much easier and better.

PETRIFIED FORESTS OF ARIZONA.

The wonders of the petrified forest in Arizona, purchased by the government in 1903 to preserve the treasures from the raids of souvenir hunters and bric-a-brac makers are little known to the average American. Specimens of beautiful agatized, also called fossilized or silicified wood, may be seen in the form of table tops, clocks, vases or bric-a-brac. The wood crystals occur in abundance, and it is not uncommon to see "forest corpses" as big around as an elephant. There are really three petrified forests, the principal one, covering about 2,000 acres, being easily accessible either from Adamana or Holbrook, on the Santa Fe railroad. Adamana obtained its name from the pioneer guide of the region, Adam Hanna. In Adamana, the first forest, is found a natural log bridge and another great column of petrified wood, known as Dewey's Cannon, tilted at an angle. Three miles away lies the second forest, which consists chiefly of bad lands. The third forest, which covers the greatest area and in which occur most remarkable geological formations, is eight miles distant from the first forest. This district contains several hundred whole trees, some of them 200 feet long, partly imbedded in the earth. By the guides this is called the "Crystal" or "Rainbow" forest, because of the brilliant colors of the silicified wood.

THE BALLAD OF THE ICE.

A little dish of broken ice
  Lay basking in the sun,
Its owner had forgotten it
  Before her work was done;
But when she went to get the ice
  And bring it in to tea,
She found the ice was not what it
  Had been cracked up to be.—*Puck.*

CITIZENSHIP REFUSED.

Kull of Newark Said He Lived in the City of New Jersey.

Judge Ten Eyck, of the Essex County Court of Common Pleas, turned down yesterday the application of William Kull of 46 Magazine street, Newark, to be naturalized.

Kull got along very well while the Court was putting him through his paces as to his length of residence in this country, but he became somewhat confused on matters of geography.

"What city is this you live in?" asked the Judge.

That was easy for Kull, who promptly replied: "New Jersey."

"New Jersey is a State," corrected the Court. "Now do you know the name of any other State?"

"Sure," responded the applicant. "Cincinnati."

"What is the title of the highest official of New Jersey?"

"The President."

"What is the President's name?"

"Roseville," instantly responded Kull.

—*N. Y. Sun.*

A TESTIMONIAL.

He had pneumonia, Bright's disease,
Delirium tremens, gastric wheeze,
An addled brain, a coated tongue,
A housemaid's knee, a smoker's lung,
Elephantiasis, cancer, gout,
And many other things, no doubt,
Until a pamphlet once he read,
"Hope in the Future! Light Ahead!!
Waters of Life, astound—amaze—
Cure all complaints in 30 days!!"

He got a bottle of the stuff;
But finding this was not enough
Took seven more in seven hours—
He's sleeping now beneath the flowers,
His humble cot is nicely draped,
His monument is bottle-shaped
And bears this legend: "Trubbils ore.
He ain't got no komplaintz no more.
Waterz ov Life, astownd—amaz—
Kure all Komplaintz in 30 daiz."

—*Wallace Irwin, in N. Y. Globe.*

Of the twenty-nine books which appeared in the *Bookman's* list of "best sellers" during the year 1905, thirteen were written by men, eleven by women, three were collaborations in which husband and wife worked together, one was the joint product of three women working together, and one, "The Breath of the Gods," was produced by an author whose sex and identity are still matters of conjecture to the public.

—*N. Y. Sun.*

DIXON'S NO. 687 GRAPHITE GEAR GREASE.

An English Opinion.

OSSETT, Yorks.

Dear Sir:—The sample you kindly sent me of your No. 687 Motor Lubricant, is the best and most slippery thing of its kind I have ever used over eight years of automobilism. It is splendid for bearings (ball and otherwise) and gears. I have ordered some from my agents.

GRAPHITE PLATE CLUTCH.

Letters Patent 804,104, to Albert de Dion and Georges Bouton, of Puteau, France.—The clutch comprises a disk of metal which runs between two disks, each faced with several annular rings of block graphite inserted in depressions in the disks. These composite disks are held within a casing on the motor shaft and are brought into engagement with the intermediate metal disk by a suitable shifter and pawls. A coil spring tends to normally keep the disks out of engagement.—*Motor Way.*

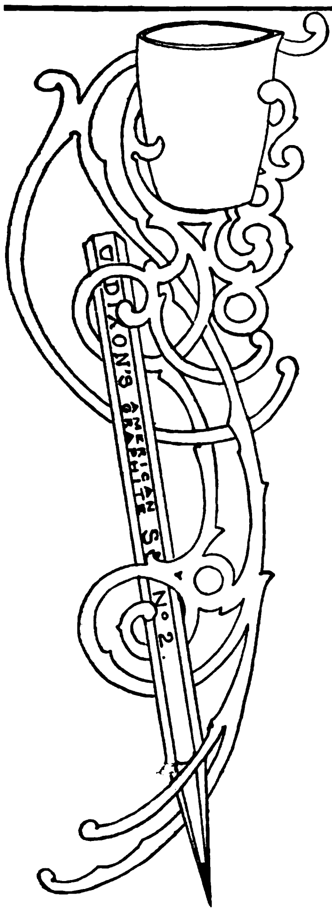
THAT government is the strongest of which every man feels himself a part. —JEFFERSON.

This is true of any organization, firm or company. The young men who take pride in their work and conduct themselves as though they were interested in a way other than for the pay envelope, do better for their company and better for themselves.

Graphite.

VOL. VIII. AUGUST, 1906. No. 8.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



JERSEY CITY'S HELPFUL HAND.

Jersey City Has Collected $15,000 for the San Francisco Sufferers.

Mr. John A. Walker, Vice-President and General Manager of the Joseph Dixon Crucible Company, was chosen by the citizen's committee as Chairman of the Executive and the handling of the moneys collected in Jersey City for the San Francisco earthquake sufferers. Jersey City's response to the appeals for aid was prompt and generous, money was raised all over the city. It was only a few days ago that the latest returns were made to the committee having the matter in charge.

The $15,000 has been received by the San Francisco committee and the secretary of the Jersey City Committee has received the following letter:—

"Kindly express to your committee our very sincere appreciation of the timely interest shown in our behalf. The funds will be wisely and economically used for the purposes designed. The situation is gradually becoming normal and all relief will be systematically administered."

CONVENTION NOTES.

The M. C. B. and the M. M. Conventions were a pronounced success.

They had a conquering atmosphere about them—an air which invariably comes with aggressive and self-assertive people.

The delegates were mostly young men, and men in early middle life, full of physical vigor and with the wholesome manners that come of good health, and a sense of one's duties well performed.

The weather helped, the vicinity contributed, as the city by the sea was in the fullness of early summer beauty.

It was pleasant for a minute to drop into such a spot wholly and consecutively devoted to pleasure, recreation, amusement and peace of mind. The exhibits on the steel pier—which extended far into the Atlantic—were notable and full of interest to the professional.

Here crowded into small space were the new wares of the leading American manufacturers. Everybody who is anybody in the eyes of a master car builder or master mechanic, was here.

Electric locomotives, new models of sleeping cars, patented dump cars (the Summers'), and every device for railway maintenance was shown by experts and to its best advantage.

Competitors were lodged in booths side by side, and the very pink of good nature prevailed between the rivals. Dixon's booth was midway up the steel pier, while Spotts, Taussig, MacNaughton, Tucker, Billy Houston and Lyne were ubiquitous in their attentions to the visiting crowd.

Brady of the Brady Brass did the honors of his ranch. Steele of the Coe Brass was a welcome visitor everywhere. Summers of the patented dump car was in attendance at the track where was located his pet.

One day Mr. MacDonald, of Newcastle, England, who sells in Great Britain Dixon goods, was there to pay his respects. Prof. Goss of Purdue University was in full evidence, and when in convention meetings he rose to speak, he had the ear of the house from the start.

The writer was there the parts of two days and is pleased to record very agreeable impressions of the entire time.

The delegates were there to learn—to see the new things —to "brush up" against fellow master mechanics and car builders, to exchange magnetism and to get a little of the breadth of the ocean in their views. The ladies were in evidence also, gaily dressed, looking happy as participants in a little vacation there.—J. A. WALKER.

SUNLIGHT FAR UNDER GROUND.

According to the New York *Sun*, the rays of the sun (no joke or pun intended) reach to the bottom of a 2,000 feet deep shaft at Sombrerete, State of Zacatecas. The town is on the Tropic of Cancer, and at meridian on June 21 the sun's rays fall vertically, so that the mine shafts are illuminated to the lowest depths.

The illumination lasts about three minutes, the light entering a hole in the roof of the head house and making the shaft so light that a person standing over the shaft can discern small objects on the floor of the 2,000 foot shaft.

At the summer solstice the light comes suddenly shining straight down the shaft, giving rainbow effects to the spurting waters of the mine leaks and paling the electric lamps. In three minutes the sunlight disappears for a year.

UNUSUAL CRUEL.

Johnnie—Me teacher has an awful nerve.

Father—What did she do ?

Johnnie—Borrowed me pencil ter give me a poor mark wid. —*Philadelphia Bulletin.*

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

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JERSEY CITY, N. J., August, 1906.

CHICAGO OFFICE OF THE DIXON COMPANY, SAM MAYER, MANAGER.

The Joseph Dixon Crucible Company has expanded its Western offices in the Monadnock building into a handsome and extensive suite of rooms. Growing business during the years which Sam Mayer has been Western manager for the corporation, make the enlarged quarters imperative. The rooms 1323 and 1324, which at one time were amply sufficient for the entire office force and its business, will now be used only as general offices and reception rooms. Miss M. E. Barrett, office manager, will be in charge of the clerks and stenographers in this office. A hallway leads from this outer office to the private offices. Room 1325 is given to the educational department, of which C. M. Harding is in charge. Its walls are almost covered with tastefully framed sketches and drawings in colors and black-and-white specimens of pupils' work in schools using the Dixon materials. The office also contains desks for Mr. Harding and his stenographer. Further along the hallway is another reception room and the private office used by Mr. Mayer himself, and Dudley A. Johnson, in charge of crucibles. Mr. Mayer's office is one of the best fitted and equipped in the city. The extension of signs depicting the merits of the Dixon goods on the windows of the corridor of the building has kept pace with the expansion of the office. A large section of one side of the skyscraper speaks for the Joseph Dixon Crucible Company.

—*Geyer's Stationer.*

JOHN M. READY—A LIVE ONE.

All the boys who attend the Stationers' Convention next week will be sure to hunt up their old friend, Jack Ready. To enable them to recognize the gentleman, we reproduce his latest photograph. This is so true to life that it is like meeting Jack face to face. No man in the country has more friends than John M. Ready, Manager of the Dixon Pencil Company, and many of them will cut out this reproduction of his familiar features and frame it.—*Geyer's Stationer.*

THE SUMMONS.

My ear is full of summer sounds
  Of summer sights my languid eye;
Beyond the dusty village bounds
I loiter in my daily rounds,
  And in the noon-time shadows lie.

I hear the wild bee wind his horn,
  The bird swings on the ripened wheat,
The long grown lances of the corn
Are tilting in the winds of morn,
  The locust shrills his song of heat.—WHITTIER.

SUMMERS' STEEL GRAVITY DUMP CAR.

Master Car Builders' and Master Mechanics' Conventions.

The Summers' Steel Gravity Dump Car illustrated is one of a hundred built for the Union Railroad, Pittsburg, Pa. This car was exhibited on the Pennsylvania Railroad side-tracks at Atlantic City, during the Fortieth Annual Convention of the Master Car Builders' and the Master Mechanics' Associations, June 13th to 20th, 1906.

The gentleman at the left of the car is Mr. John A. Walker, Vice-President, General Manager and Treasurer of the Joseph Dixon Crucible Company. Mr. Walker's pleased expression is a result of the careful examination he had just made of the excellent mechanical features of the Summers' Steel Gravity Dump Car, and the good protective condition in which he found Dixon's Silica-Graphite Paint, which was used on the car. At the extreme right of the car is Mr. E. W. Summers, designer and builder of the Summers' Steel Gravity Dump Car, with general offices in the Farmers' Bank Building, Pittsburgh, Pa. Mr. Summers has invented the most economical gravity dump car of the day, with a weight capacity of 100,000 lbs., and a cubic capacity of 40 yards.

The car, which is illustrated herewith, is so constructed that it will dump all the load between the rails, all outside the track on either side, or on both sides as desired. It is so built as to dump any load in any of the above positions, the operator discharging the load and closing the doors from the opening platform at the end of the car. It is not necessary to stop the train to discharge the load or close the doors. The Chief Engineer of Construction on one of the large railroad systems, said recently: "These cars will save their entire cost inside of four months."

A feature of the car is the flexible arrangement of the doors combined with the rigidity of the car body, the sides of the car having ample depth with large top flange area to take care of the compression, due to vertical load, and the heavy box-like section of the lower sides, combined with deep car beams, make a very rigid construction. The doors are locked and are interchangeable with each other. Each door is supported on 4⅝ inch coil chains; the chains and shifting are protected from the loading by the double webbed floor beams, so that the doors only are exposed; the arrangement being such as to permit of rough usage and staying in service.

Mr Summers' personal experience in past years with the protective and wearing qualities of Dixon's Silica-Graphite Paint, caused him to specify the use of Dixon's Black for the preservation of one hundred Summers' Steel Gravity Dump Cars, recently delivered to the Union Railroad, Pittsburgh, Pa.

Mr. Summers' heartily approves of the recommendations of the Master Car and Locomotive Association, that an *elastic preservative coating* should be used in the construction and maintenance painting of steel cars.

On page 671 of this issue of GRAPHITE, will be found the report of the Master Car and Locomotive Painters' Association, containing practical suggestions for the painting of steel cars, with an explanation as to how Dixon's Silica-Graphite Paint meets the requirements of an elastic preservative coating.

A correspondent in New Zealand writes us that many oil engines of American make are in use there by the farmers and residents of the numerous sounds and bays with which the coast of that country abounds and that he has for a long time been very much interested in graphite lubrication, using Dixon's Graphite for cylinder lubrication as well as for ordinary bearings of steam engines with marked success, and he has no hesitation in recommending it to all his friends.

Catharine, N. Y.

Folder with pencil received. I think the pencil is all that could be desired in a pencil of the kind, and will recommend it to my friends.

Thanking you for the favor, I am, F. BELLE LYON.

DIXON'S GRAPHITE EXHIBIT AT THE ATLANTIC CITY CONVENTIONS.

Atlantic City, the unrivalled city by the sea, is accustomed to big conventions and elaborate displays, but never in the history of that city has any convention equalled the size and importance of the annual conventions of the Master Car Builder's Association and the American Railway Master Mechanic's Association, held on the steel pier, June 13th to 20th, 1906.

The design of the steel pier provides for the comfort and entertainment of pleasure seekers, but some three hundred progressive manufacturers of railroad supplies transformed it in a few days into arcades of booths for the display of material used for the operation of railroads.

The first booth to be completely finished and ready for visitors, was that of the Joseph Dixon Crucible Company, Jersey City, N. J., designed by C. H. Spotts, Manager of the Paint Department. The treatment of the interior and exterior of the booth was in dark greens, browns and whites, with an artistic wall arrangement of framed photographs and delicate ferns in plumbago crucibles, with a special interior electric arrangement for night display.

The booth was visited by thousands of visitors, attracted by the signs "Please Sign Visitor's Card—Keep the Pencil—Dixon Makes a Thousand Different Kinds of Pencils."

Mr. John A. Walker, Vice President, General Manager and Treasurer, visited the Dixon booth frequently, during his stay at Atlantic City, as a special guest of the Master Car Builders Association. Mr. Malcom MacNaughton and Mr. Lewis F. Lyne, Mechanical Engineers, Mr. C. H. Spotts, Mr. W. A. Housten, Mr. John F. Tucker and Mr. Elwood M. Taussig, in attendance at the Dixon booth, explained the advantages and uses of Dixon's Graphite Products which are applicable for railroad use. Particular attention was given to explaining the preserving qualities of Dixon's Silica-Graphite Paint for steel cars and car roofs.

The Master Car and Locomotive Painter's Association recommends that the car owners' interests are best conserved by the careful use of a preservative coating, which is highly *elastic*. Special literature had been prepared by the Joseph Dixon Crucible Company, showing that Dixon's Silica-Graphite Paint contains the necessary factors of a good paint for steel cars.

The souvenirs presented to the visitors were Dixon's "Eterno" Pencils, which write black and copy purple, also very attractive celluloid-covered blotters containing a good view of the beach during bathing hour at Atlantic City.

LONG ARTICLES AND HOT WEATHER.

It is more or less of an affliction to read a long article on a hot day and we did not expect to have in August GRAPHITE more than one article of any length, but find it impossible to carry out our expectations.

We shall, however, make no apology, for everything we offer this month is well worth reading even if it has to be laid aside for a fall in the thermometer.

STEAM TRAPS.

By W. H. Wakeman.

Chapter III.

Study of previous illustrations shows that some traps, fitted with floats to operate their valves, discharge continuously, while others are filling a portion of the time and discharge at intervals. The bucket traps that are to be presented next must of necessity discharge at intervals only, as it takes more or less time according to size of trap and amount of radiating surface to be drained.

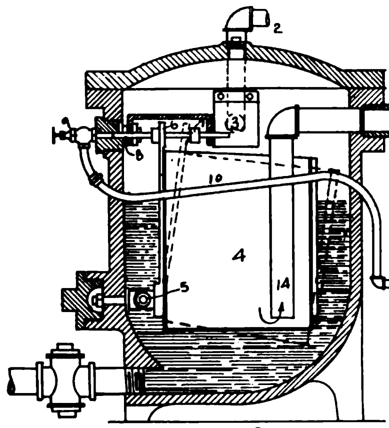


FIG 13

Fig. 13 is a specimen of this type. Water of condensation enters at the rear as the trap now stands, through the pipe *2* shown in dotted lines behind the baffle plate *3* and falls to the bottom of the body of trap.

At this time the bucket *4* is supposed to be in the position indicated by the dotted lines as it is hinged at *5*. Water continues to rise on the outside of the bucket (which is practically empty) until it overcomes the dead weight of the bucket, causing it to take the position shown by the full lines; and while it is in this position the outlet valve is closed so that no water can escape, but when the bucket fills and the extra weight is added, causes it to tilt downward a projecting ear, strikes the tappet *7* and opens a valve *8*. The

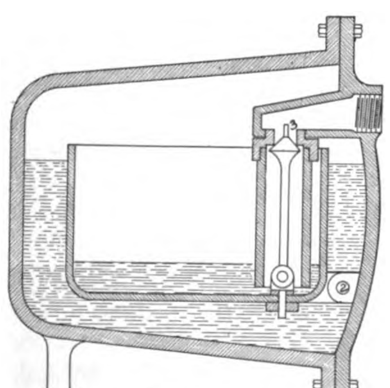


FIG. 14

angle valve *9* being open, steam passes through *10* and is admitted to the bottom of piston *11*, which is thus forced upward, carrying the valve *12* with it, thus opening a passage *13* to the atmosphere. Pressure acting on the water surface forces it out at *14* until the bucket is empty; when it tilts upward, the valves *8* and *12* are closed and the entire process is repeated.

Fig. 14 shows another but much more simple trap fitted with a tilting bucket. As shown the bucket is nearly empty, and as it is hinged at *2*, the rising water coming in through a pipe not shown, brings the bucket into the position illustrated in which the outlet valve *3* is closed. As the water continues to rise it overflows into the bucket and the weight causes it to tilt downward, the effect of which is to open the valve *3*, when pressure acting on the entire water surface forces it out rapidly.

It always seems more natural to have the outlet from a trap flow downward and in some cases it is absolutely necessary for it to do so, but with the traps just described, (and several other kinds,) the waste water may be raised several feet above the trap. In fact, the only limit to the height is caused by the steam pressure carried, for it is possible to raise water two feet for each pound pressure behind it. It must be remembered, however, that this is pressure at the trap and not at the boiler, because friction of long pipes, of insufficient diameter and rapid condensation of steam, may make several pounds difference.

Another point to be considered is that where water must be lifted in this way the amount discharged per hour will be less than if it flowed away freely. Many of our cellars and basements are below the sewer, therefore it is frequently very convenient to have a trap that will raise water a few feet and do it easily.

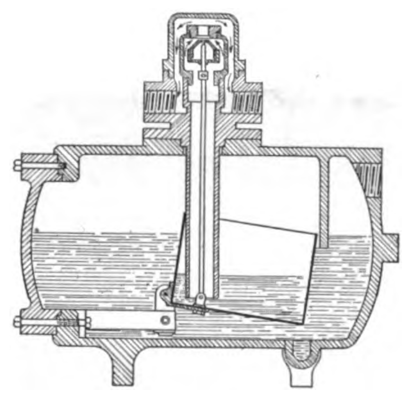


FIG 15

Fig. 15 is another trap fitted with tilting bucket. As long as the bucket is in its highest position the outlet valve is closed, but when water overflows over into the bucket, causing it to sink, the outlet valve is opened and water is blown out or discharged.

There are some places where it is desirable to have a trap discharge continuously, as for illustration when taking condensation from radiators and banks of pipes in rooms where noisy apparatus cannot be tolerated, even if the noise is not loud enough to be noticed in shops and mills containing machinery that sings and purrs as it performs its work. Engineers who have always been employed in these shops cannot appreciate the requirements of school rooms, &c., where absolute quiet for a greater portion of the day is necessary.

On the other hand, there are places where an intermittent discharge is preferred, as for illustration where coils of pipe are located in vacuum pans and kettles used for boiling sugar to make candy. These coils are set in kettles so that the outlet is as high as the inlet, while much of the pipe is below both of them.

Condensation settles in the bottom of such a coil, accumulating flows to the trap, which fills and then discharges. While it is discharging it is practically the same as if there was no trap on the line, for there is a grand rush of steam and water through the entire coil, which effectually clears it, and the whole apparatus is in good order for further work. I do not claim that a continuous discharge trap cannot work in such a place, but all traps are not equally efficient in this respect, and it is a well-known fact that sugar can be boiled much better at given times than at others, although nobody engaged in the business may be able to account for the difference.

The difference in time required for the process of boiling, under different conditions, affects the cost not only in actual time required, but in cases where water collects in such vacuum pans and steam kettles it absorbs heat by re-evaporation which ought to go into the sugar to be boiled, and by prolonging the process the ingredients are sometimes spoiled, thus making delay a very costly luxury that is not appreciated. This makes it especially desirable to have a suitable trap in every case.

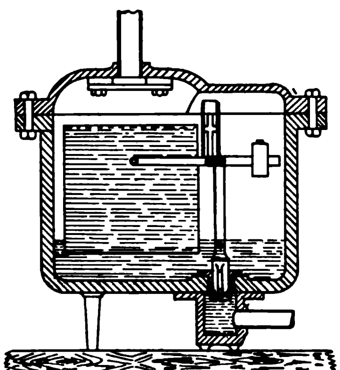


Fig. 16

Fig. 16 illustrates a bucket trap in which the bucket is always full of water, operating as follows: The bucket is supported by a forked lever, as shown, which extends one-half way around the circle, at each end of which a stout pin is fastened to the bucket and passes through the end of lever. A counterweight is adjustable on the opposite end of this lever, so that when ready for use it is practically balanced.

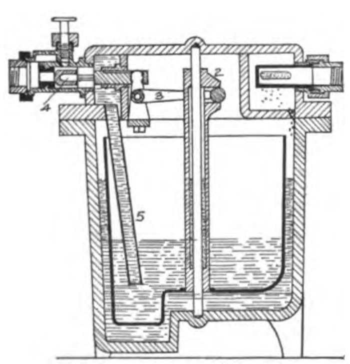


Fig. 17

Water from the heating system enters through the upper central pipe and falls directly into the bucket, causing it to fall as low as possible. When full, the water overflows into the body of the trap and, rising, brings the above mentioned lever almost into equilibrium again by restoring the buoyancy of the bucket.

It will be noted that the outlet valve opens downward, consequently when the bucket and counterweight are almost equally balanced, steam pressure acting on this valve causes it to open and discharge water, but before all of it escapes the bucket falls and closes the valve, thus preventing the escape of steam.

I have noticed that the internal parts of all traps become corroded through the action of water standing in them. Although cast iron is freely used in the construction of these appliances it does not escape the general bad effects. Corrosion here appears in the form of half spherical blisters, inside of which is a small collection of black matter and underneath this the iron corrodes rapidly.

Such blisters are not formed by the disintegration or separation of the iron as in the case of a boiler plate, but by the collection of foreign matter. If this is removed and the whole internal surface covered with Dixon's Fine Flake Graphite mixed with a small quantity of cylinder oil, and the mixture is well rubbed down to give it a good surface, there can be no corrosion until the graphite wears off. Of course, we cannot expect steam fitters who set up traps for other men to use, to interest themselves in such details, but where an engineer is superintending the installation and repairs of a plant in which he is to spend the greater part of each week, he should secure the best possible results by attending to all such matters himself.

Fig. 17 is a form of trap in which the bucket rises and falls in a straight line. Water enters at the right hand side and at once passes through a small strainer that retains any foreign matter that is not wanted in the trap. This strainer can readily be removed for cleaning, by unscrewing the union just outside of the trap.

As water falls from this strainer it is caught in the small chamber below it, from whence it runs out through a passage close to the shell into the lower part of it, outside of the bucket. This causes the bucket to rise, carrying with it the slotted guide sleeve *2*, which supports the inner end of the lever *3*, the effect of which is to close the discharge valve *4*, and keep it closed as long as the float remains in its highest position.

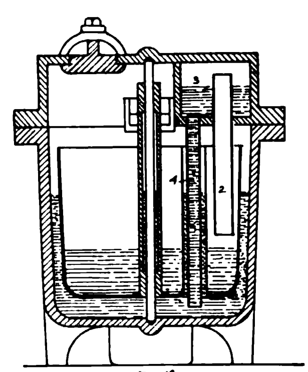


Fig. 18

Water continues to enter until it partly fills the bucket and covers the lower end of pipe *2*, Fig. 18, which is a view of the same trap except that it is taken at right angles to Fig. 17. Water will now be forced up into the small tank *3*, and it thence falls into the bottom of the trap. When the bucket is nearly full its weight causes it to fall and open the valve *4*, Fig. 17.

Pressure is now acting on water surface outside of the bucket, hence some of it is forced out through the discharge valve *4*. Pressure also acts on the surface of water in the bucket, forcing it upward through the pipe *5* to the discharge valve *4*. If it was now necessary to wait until slowly incoming water from the heating system raised the bucket, it would result in wire drawing action on the discharge valve, as it would be partly open for some time, and this is not desirable, but water from tank *3*, Fig. 18, flows down into the body of the trap through pipe *4*, quickly raising the bucket and closing the discharge valve *4*, Fig. 17.

(*To be Continued.*)

THIS IS A VACATION MONTH.

Its pleasures will be added to by the possession of a nice assortment of Dixon's American Graphite Pencils.

GRAPHITE FOR INNER TUBE TIRES.

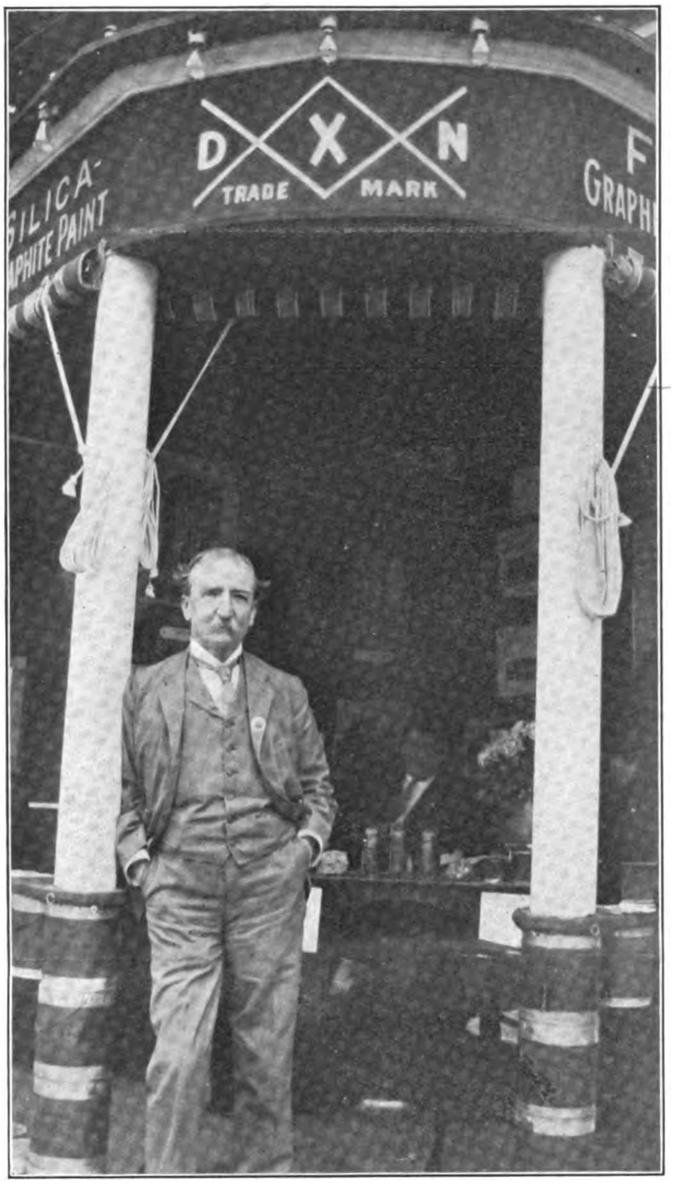
While the Dixon Company has known for a long time that for inner tube tires Dixon's Special Graphite No. 635 was far superior to soapstone, yet we have not advocated its use for the reason that Dixon's No. 635 Graphite is black and soapstone is white.

Most of those who have use for a lubricant for inner tube tires have infinitely preferred using the white material rather than something that is black. Lately, however, we have found quite a number who have claimed that Dixon's No. 635 Graphite was so much superior to soapstone that it was more than worth the annoyance of the blackness to use it.

Graphite being such an excellent conductor of heat and soapstone such a poor conductor of heat, the use of graphite will largely prevent the heating of the tires, at least this is the claim, and the reason seems to be fairly good.

Baker City, Oregon.

"Eterno" came this day. Very satisfactory copier indeed. Many thanks. WM. J. NORTHROP.



DIXON'S GUARDSMEN.

Atlantic City Conventions.

One of the honored guests at the Annual Convention of the Master Car Builders' Association, and the American Railway Master Mechanics' Association, Steel Pier, Atlantic City, N. J., June 13th to 20th, was Mr. John A. Walker, Vice-President, General Manager and Treasurer of the Joseph Dixon Crucible Company. The snapshot picture of Mr. Walker shows him standing beneath the well known Dixon's trade mark, which is the guardsman of highest graphite quality. It is appropriate that the view should show Mr. Walker and the Dixon trade mark, as they are always found together at the General Offices in Jersey City.

Mr. Walker's many years of active business life have been spent in official capacities directing the progress of the Joseph Dixon Crucible Company. Early and late and at all times he has been an earnest advocate and guardsman of the good name of the Joseph Dixon Crucible Company; the symbol of which is shown at the entrance to the Dixon Graphite Exhibit.

In another article of this issue of GRAPHITE, Mr. Walker writes entertainingly of his excellent impressions of the many exhibits of railroad supplies and the persons making up this important assembly of railroad officials and manufacturers.

Thousands of visitors registered at Dixon's Graphite Exhibit on the Steel Pier during the two conventions. The center of attraction at the booth was the large original drawing of the Joseph Dixon Crucible Company's factory buildings, power plant and general offices. This fine drawing in colors was greatly admired, and pleasing comments made on the size and number of the Dixon factory buildings. Large framed photographs on the green burlap-covered walls of the booth showed visitors, notable bridges and buildings in different parts of the world that have their metal surfaces protected with Dixon's Silica-Graphite Paint. A great deal of interest was displayed in the photographs illustrating Haddon Hall, Atlantic City, which has its metal roofs protected with Dixon's Natural Color. The Chelsea Hotel, Atlantic City, which has its metal roof protected with Dixon's Dark Red, and the United States Light House at Atlantic City, the center exposed section, showing the even and excellent appearance of Dixon's Black, in contrast to the yellow paint with which the lower and upper sections of the light house are painted.

Our representatives at Dixon's Graphite Exhibit had for a slogan, "Welcome All," and many visitors will no doubt recall for many years the pleasing attention that they were given at this booth.

THINGS THAT SQUEAK AND STICK.

The *Bicycling World* says: "A squeaking chain is an abomination to every dog on the road. Also, it is a sign that the chain needs a thorough cleaning and a good bath in lubricating oil, followed by a gentle application of graphite in conservative doses.

There are many other things that squeak and stick and that are as annoying to the man as the squeaking chain is to the dog.

There are the drawers of the office desk and the kitchen table; the doors of closets and book cases, and a hundred and more other things every one of which can be cured by "a gentle application of graphite in conservative doses."

We recommend Dixon's Finely Pulverized Flake Graphite No. 635.

A GUIDE TO NEW YORK.

"A Day in New York" is the title of an interesting and helpful little booklet just issued by the Joseph Dixon Crucible Company for visitors to the metropolis. General information as to the topography of the city, its main thoroughfares, points of interest, churches, etc., is given.

A unique feature, and one which will appeal to the visitor whose time for sight-seeing is limited, consists in plans for one-hour, two-hour, three-hour, half-day, evening and whole-day tours of the city. The routes are carefully planned and remarkably comprehensive. Hints for saving time and trouble, rates for cab and coach hire and a list of subway stations complete the book.

The prospective traveler to New York, be he teacher or business man, should not fail to write for a copy to the Joseph Dixon Crucible Company, Jersey City, N. J. A postal request will bring it.

Dixon's publications sent free upon request.

PRACTICAL SUGGESTIONS FOR THE PAINTING OF STEEL CARS.

Report of the Master Car and Locomotive Painters' Association.

It is the sense of this association that, in the construction and painting of steel cars, the following points are of vital importance for their preservation:

First.—All flash or mill scale, rust, oil, grease and dirt should be entirely removed from all parts entering into the construction of cars before any paint is applied. We believe that this can be best accomplished by the use of the sand-blast.

Second.—During construction, all overlapping joints, whereever metal is placed upon metal, should be thoroughly coated with a heavy mixture of moisture-repelling paint.

Third.—The initial painting, being of the greatest importance, should be done in the best possible manner. The first coat should be applied immediately after metal has been sandblasted and before the cleaned surface can accumulate rust.

The material should be of an elastic nature and sufficient time should be allowed between coats for drying. It should be put on evenly in a workmanlike manner.

Fourth.—We believe that not less than three coats should be applied to all exterior parts of body, including underframing, and two coats on interior of body; also all parts of trucks except wheels and axles.

Fifth.—We recommend a rigid inspection of the cleaning and painting of cars under construction by competent, practical men, believing this in the line of economy.

Sixth.—We would suggest that the abuse of cars in service be stopped by discontinuing the loading of hot slag, billets, etc. Also that the hammering of side sheets and other injurious methods used to facilitate unloading be discouraged.

Seventh.—In the repainting of cars, all corrosion and loose paint should be removed with steel scrapers and wire brushes or the sand-blast, and not less than two coats of an elastic preservative coating applied to all cleaned parts.

As the greatest loss from corrosion is found on the interior parts of coal-carrying cars, we would consider the matter of painting those parts worthy of serious consideration.

These Master Car Painters, thoroughly familiar with best methods of steel car painting, have decided that the car owner's interests are best conserved by the careful use of a preservative coating which is highly *elastic.*

The Elastic Preservative Coating to give true Protection for the longest period of time, must consist of correct proportions of perfectly inert pigments and best grade linseed oil. The maximum elasticity and life of the linseed oil is secured by its natural oxidation, and the protection that is afforded to it by the pigments.

These necessary factors in good paint for steel cars are found in Dixon's Silica-Graphite Paint, which has been satisfactorily used for over forty years. It is not an experimental coating, but a time-tested and proved elastic preservative for metal constructions.

Each particle of Dixon's Ticonderoga Flake Graphite Paint pigment is a shield protecting the linseed oil which binds it to the metal. No other paint pigment has this flake form for the preservation of the linseed oil. Dixon's Silica-Graphite Paint pigments are inert, exerting on the linseed oil no harmful chemical influence to reduce its natural elasticity and life.

Dixon's Colors save materially in cost of labor and brushes in application. The lubricating properties of Dixon's Flake Graphite Pigment permit the use of the greatest possible volume of fine pigment, and the brushing out with ease of good substantial coatings of about 500 to 600 square feet to the gallon.

Adhesion, elasticity, resistance to mechanical injury and permanency of color indicate the Four Standard Dixon Colors as unequalled for railroad cars, subjected in transit to constantly varied atmospheric conditions, in combination with wind-driven dust, cinders, and mechanical abuse.

A SEASONABLE ARTICLE.

On the Depressing Influences of the Details of Crime, Faithlessness, Vulgarity and Dishonesty as Depicted by the Daily Papers, and the Remedy.

Depressed by the enormous quantity of uncanny reading one gets even in the most conservative daily papers—we mean the details of crime, faithlessness, vulgarity and dishonesty—which leads one sometimes to ask, "has everybody fallen from the key?"

At such a time it is pleasant to come across notes like the following from *Science*, under date of June 22, 1906. The article concerns the bestowing of the degree of LL. D. by the University of Pennsylvania on the following eminent men.

EDGAR F. SMITH, President of the American Philosophical Society. Eminent chemist, humane, beloved of God and men.

WILLIAM BERRYMAN SCOTT. Distinguished Professor of Geology and Paleontology at Princeton University.

EDWARD CHARLES PICKERING. Student of the relation of stellar distance to the intensity of illumination. Distinguished founder of the first physical laboratory in America.

HUGO DE VRIES. King of the plant world. Professor of Plant Anatomy and Physiology at the University of Amsterdam.

ALBERT A. MICHELSON. Considered the foremost physicist in the United States.

ERNEST RUTHERFORD MCDONALD, Professor of Physics at McGill University, Montreal. Doubtless the leading authority in the world upon radio-activity.

EDWARD LEAMINGTON NICHOLS. Professor of Physics at Cornell University.

WILLIAM KEITH BROOKS. Distinguished for his biological exploration of our Atlantic coast and of the West Indies.

WILLIAM PATERSON PATERSON. Sincere teacher of the knowledge of things divine.

HENDRIK ANTOON LORENTZ. *Facile princeps* amongst the physicists of Holland.

ALOIS BRANDI. Shakespearean scholar. Student of the nature and history of man as disclosed by speech. His personality as charming as his scholarship.

SIR GEORGE HOWARD DARWIN. Distinguished son of an illustrious father. The name and fame of father and son will endure until "tideless sleep the seas of time!"

JAMES GAYLEY. Combining in himself in the highest degree the rare qualities of scientific knowledge and the power of transmuting this knowledge into practical results.

HAMPTON L. CARSON. Able student. Great power of orderly massing of facts.

JOHN WILLIAM MALLET. Distinguished chemist.

GUGLIELMO MARCONI. Investigator, theoretical engineer, inventor. Postmaster-General for thousands who "go down upon the sea in ships," and soon for the world.

SAMUEL DICKSON. Learned in the law. Independent thinker.

ANDREW CARNEGIE. World benefactor.

EDWARD VII. King, Defender of the Faith, Emperor of India.

In addition to the above the degree of Sc. D. was bestowed upon WILLIAM P. HENSZEY. Notable for his contributions to civilization, through his scientific work in the evolution of the modern American locomotive.

The account of the bestowing of the above degrees and the additional remarks which we have been obliged to omit for want of space is elevating reading. It bears witness to what is best in human nature. The men whose names are mentioned are leaders—the gifted ones—those who become the sovereigns in the mental and moral worlds.

In this same connection it should be remembered that this group better reflects the average than the vulgar group which through the daily records are thrust so officiously before our eyes that its scope and extent is exaggerated. The multitudes of our people are honest; are self-respecting; are in their own way God-fearing; are modest; are refined; so do not let the perhaps necessary daily records of crime poison the mind, rather think again of the above twenty distinguished names as representing us and as representing the majority.—JOHN A. WALKER.

PROSPERITY STILL AT HIGH TIDE.

Very Little Unrest in the United States Just Now.

According to the New York *Tribune*, of what speaker Cannon said Mr. Creelman writes as follows, and Mr. John A. Walker, Vice-President and General Manager of the Joseph Dixon Crucible Company, thinks it should be printed in double-leaded type in all the papers. It is certainly worth reading:

The truth is there is very little unrest in this country just now. I know how hard a few demagogues are working to discredit the prosperity of their country, but the people are too busy, too prosperous to make calamity-howling a success. This country is not going backward; it is going forward. The people of the United States, whether on the farms or in the cities, are all doing business at a better profit than ever before. The facts show it, and you can't get away from facts.

Our prosperity depends upon production and a market. The production increases and the market increases. Nine-tenths of the whole production of our people is consumed in the United States. Something like a third of the people are engaged in the basic industry, agriculture, and these farmers have become better customers of the two-thirds of the population engaged in industry at better wages than they have known before. You can get some idea of our present success when you consider the fact that the United States produces about one-third of the civilized world's manufactured and agricultural products, that the vast bulk of these products is consumed by the American people and that the comparatively small surplus which we send to foreign markets makes us the greatest exporting nation on earth.

The condition of the American people was never so good as now. There never has been so little suggestion of a change of policy in the government. The dissatisfaction in the labor world does not arise from want of employment at a profit that enables the wage-earner to live well and save something, but arises from a belief that the worker is not getting his share of the profits of production; and the dissatisfaction regarding transportation arises from the belief, more or less well founded, that the carrier discriminates between shippers. But, in the aggregate, the charges for transportation in the United States are less than elsewhere in the world and have been decreasing through a long period of years.

This talk about the country going to the devil is the mere raving of demagogues. The average man was never so profitably employed in the history of the world. This is not a theory. It is an actual fact. The average man was never so well educated, so free, so well fed, well housed or well clothed. Society was never better balanced than now, nor was the American Republic ever so well established at home and abroad, or more beloved by its people.

As for the charge that the tone of our political life and public service is becoming baser, I have no hesitation in saying, after thirty years' experience here, that Congress has constantly improved in its devotion to the public service as well as in efficiency and strength.

We need have no fear that socialism will control this country. If I understand what socialism is, it means substantially a division of all material things without regard to the value of the contributions made by individuals. It is the dream of the impracticable on the one hand and, on the other, of the selfish, who desire to live in the sweat of somebody else's face.

I have been hearing predictions of the downfall of the Republic and the enslavement of the people all my life. These are the mere mouthings of demagogues. They were made out in Indiana and Illinois before the days of railroads, and they are made now, with less of force and, I sometimes think, with less ability than before. It does not require much brains or much information to become a successful pessimist.

This is the most wonderful country in the world, and this is the most wonderful, the most successful and the most interesting time in its existence. Capital and labor in all avenues of employment make matter assume shape more useful to the human family and with less effort than ever before in any country or by any race in the history of the world.

I don't object to kickers, mind you. Criticism is not a discouraging thing. It would be discouraging if there were no criticism of existing conditions and no effort to improve them. But the man who kicks without cause is a common liar.

All our troubles come from the rapid development of the country. We have been so busy developing it that we were bound to wake up and find that abuses had crept in. The American people have a capacity for self-government and they will see to it that, without interferences from any man or any group of men or corporations, every existing evil will be remedied.

THE MAN WHO SELLS.

By George A. Post.

What means this prosperity? Sales. Sales necessitate transportation. Transportation calls for power and vehicles. The results are felt in every part of the country. Sales light the furnace fires, blacken the sky with smoke, set machinery in motion, quicken the demands for labor, and spread the smile of plenty over the face of the land.

He who sells things is the apostle of happiness; he is the bulwark of prosperity; he fills the hotels; he crowds the trains and he loads the freight cars with goods. The man who sells things is the best friend of everybody. He makes the people believe they need it; he is patient, tactful, broad-gauged, generous, good natured and tireless; for him no whistle blows to sound the end of his daily toil; for him there are but few peaceful evenings at his home fireside; for him it is hustle, hustle, hustle; he travels up and down the highways; he seeks audience with and tells his tale to men of varying titles; he runs the gauntlet of every conceivable degree of importance from the president to the office boy.

All honor to the man who sells things. Let us call him the commercial engineer. When he is not abroad in the land there is "nothing doing." His appearance foretells commercial activity, and just in proportion as he succeeds, the tide of prosperity ebbs and flows. The man who brusquely turns him down, or who affects to be bored by his presence, or who bars him from his office, does an injustice to the interests confided to his care, and also robs himself of a large amount of information that he needs in his business.

THE HISTORY AND DEVELOPMENT OF THE LEAD PENCIL.

By J. A. Walker, *Vice-President Joseph Dixon Crucible Company, Jersey City, N. J.*

NOTE.—Delivered by Mr. Walker before the members of the "Boost Club," of New York City, May 10, 1906, and secured verbatim by a special representative of "Offices Appliances," the same being protected by copyright —EDITOR.

The first thing about a lead pencil is that there is no lead in it; that is, no metallic lead. The heart and soul of a lead pencil, commonly known as lead, is properly called "graphite." The mineral has three names: graphite, plumbago and black lead. It is called graphite in scientific circles, plumbago by the custom house people and lead in ordinary parlance.

There is not a very remote antiquity to the lead pencil. Some old parchments are known that were marked with lead ruling, but this must have been metallic lead. LeMoine, a writer of the year 1537, speaks of documents marked with graphite. Other writers have found papers which were evidently written with a piece of graphite inserted in the end of a stick. This shows the evolution of the pencil, beginning with the use of a piece of graphite in connection with a stick.

SCHOOL GIRL ORIGINATOR.

The first pencil factory in America was founded by a school girl. There was a graphite mine in England at that time, called the Barrowdale mine. This school girl, from somewhere obtained some of these pieces and anticipated quite closely the pencil method of modern days. In some way she crushed this graphite, either with a hammer or a stone, and then employed gum, mixing the two together, and then cut an alder twig, dug the pulp out, and stuffed the little alder cylinder full of this gum and graphite, and thus produced the first lead pencil made in America. This took place in Danvers, Mass. Later, a man by name of Joseph W. Wade, co-operated with this girl, and together they made a number of lead pencils after this same fashion. The girl's name is not known.

After Mr. Wade came one Monroe, who made pencils first at Concord, N. H. They were fairly well made, and answered the purpose, and became articles of commerce at that time. About the same time, the well known literary man, Henry D. Thoreau, also of Concord, made pencils. Thoreau was an impecunious man, always poor, always in trouble for lack of ready money, sometimes in debt, and at one time was put in jail for not paying his taxes. After he got his pencil business started, his friends said, "Now there will be an end to Henry's poverty," but he dropped the work about as soon as he commenced it, and said he could not afford to spend his time on something that was already finished. If he could have seen the lead pencils of today he would not have thought that he had worked out to its full completion the evolution of the lead pencil. This happened somewhere about 1820 or 1825 in Concord, N. H.

After him came a man by name of Wood. Wood associated himself with Monroe. Wood was a very clever fellow, an inventor and originator of clever machinery and made some circular saws and knives, which he set to work on pencil making. In that way he anticipated some of the up-to-date features of the present pencil machinery.

Joseph Dixon, the founder of the Joseph Dixon Crucible Company, about this time also made lead pencils after the same system. We have some in our office yet that he made at that time. This practically completes the beginning of lead pencil making in the United States.

ENGLISH AND GERMAN PENCILS.

To go back to England, the Barrowdale mine was the source of the graphite, and the pieces of graphite quarried were said to be in such form that they could be sawn and pressed into the wood. It could easily be forseen, however, that pieces of this kind were not very numerous. It then occurred to a Frenchman by name of Conte to powder the graphite and put it together with a binding material, and he worked at it until he produced the graphite part of the pencil substantially as it is made now. Not much, however, was done with it, either by Conte or by any other Frenchman. The Germans then took it up, and while this Frenchman was the originator of this system, to the Germans belongs the credit of working it out and putting it into present shape.

Concerning the coming of the Germans to America, Faber came first, in 1861. The second American factory was founded by what is known now as the American Lead Pencil Company. They started in 1864. In 1867 the Eagle Pencil Company transferred their interests here, and in 1872 the Dixon Company started. The Dixon Company sold their first pencils in 1872. They had been experimenting three or four years before that, and the first invoice was sold to Voorhees Brothers, Morristown, N. J.

AN INTERESTING PROCESS.

The work of pencil making is picturesque. All the visitors to the Dixon works say they had no idea it took so many

processes to make a pencil. The work is ingenious and attractive, and a nice exhibit of mechanical talent. The number of raw materials used is between forty and fifty, and the whole world contributes to the assembling of them. Most of the processes are done by automatic machinery, and the process of pencil making is an object lesson which pleases everyone that comes to see it.

GRAPHITE MINES.

The Dixon graphite mines are located in Ticonderoga, in the northern part of New York state, and the Dixon cedar mill is located in South Florida. They are so far apart that in the winter, when the mercury at the graphite mines is 40 degrees below zero, the temperature at the cedar mill is 70 degrees above. These graphite mines produce about 130 tons of rock and graphite every day, and the machinery for producing this is very large, and consists of an elaborate system of crushing stamps and washing mills. The graphite is carefully separated from the rock before being sent to Jersey City. The first step in Jersey City is to get all the grit out of it. It goes through the process of washing and sifting through many machines until it is passed upon as absolutely perfect.

GRADES BY BLENDING.

The clay, which is the binding material, is treated in the same way. The clay is mined in Germany. It is cleaned and made ready for the mixture by an elaborate cleaning and sifting process. By a combination of the two the so-called lead is produced, and by the blending of the two the grades are produced. The more graphite and the less clay the softer the pencil, the more clay and the less graphite the harder the pencil. In this way the various grades are produced, running all the way from very, very soft, until you reach the very, very hard. The soft leads are made larger than the hard ones, to obtain in that way the necessary tensile strength. When the mixture is perfected it is put into a very heavy hydraulic machine, the bottom of which is full of holes. Heavy pressure is brought to bear and the mixture is forced through these holes and falls into a tub below. This is repeated time after time until judgment assures the worker that it is well kneaded. Then it is put through a similar machine with a single hole in the bottom. As it is passed through this single hole it comes out as strong as a shoestring. The next step is laying these leads out on a board 21 inches long and, when dry, they are cut into pieces seven inches long, placed in a crucible, sealed up and baked in the kiln, where the temperature reaches 2,200 or 2,300 degrees Fahrenheit. After being taken from the kiln they are ready then to be placed in the wood.

MAKING THE WOOD.

The wood, as we mentioned before, is cut in Florida. The logs grow there. The consumption of cedar logs, suitable for pencils, is going on at a greater rate than the growth. One of these days cedar will be a thing of the past. The pencil people have to be forehanded in supplying themselves with a large quantity of cedar to protect themselves against any contingency.

The product of the sawmill is what is called a slat, which has the width of six pencils, the thickness of half a pencil, and is seven inches long. In that condition they are sent to us in Jersey City by the carload. Where the wood will not produce six pencils it is cut into five, or if necessary four, or three or two. The expense of gathering the cedar and cutting these slabs is immense.

SHAPING THE PENCIL.

The next step is removing the pitch from the cedar. This is done by a system of boiling, and after the boiling they are thoroughly kiln-dried. Coming from the kiln, the slat is sent to what is called the grooving machine, where in one motion it receives the six grooves. From there it goes to the table, where the leads are laid in, after which the glued other half is fitted, and then they are confined in certain clamps, screwed up tight and left over night. In due time the blocks are released and ready to go to the shaping machines. These glued blocks, as they are called, are fed in at one end of the shaping machine and the pencils, perfectly shaped, come out at the other end, and they can be either hexagonal, round or any shape that one pleases. The knives cut them exceedingly smooth.

From the shaping machines they go to the varnish machines, to which they are fed with a hopper. Each pencil as it passes through the varnish machine gets itself coated with varnish, is picked up and returned to get a second coat, etc., until it receives as many coats as the system calls for. It will be observed that the varnish in this way varnishes also the end of the pencil as well as the sides, so they then go to another machine that trims the ends. A preliminary trimming is done first and then the partially trimmed ends are submitted to a very sharp knife, which finishes them.

APPLYING GOLD LEAF.

One of the most troublesome rooms in the pencil factory is where the gold leaf is laid on. It has to be a room where the air is necessarily excluded. The gold leaf is laid on, and great skill and care is exercised in getting the gold leaf cut and laid on properly on a round or hexagonal pencil. The pencils are then conveyed to stamping machines and the letters of the die are stamped into the gold. After the impression is made on the gold leaf the surplus gold is rubbed off and then we have the stamped letters as you see them on the ordinary pencil.

After this comes the sorting, labeling of the boxes, and the pencils are ready for the market.—*Office Appliances.*

"BETTER THAN MONEY."

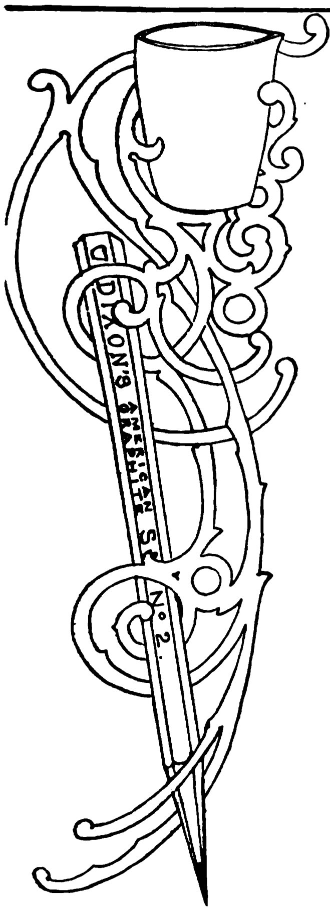
The following is from a notice of Dr. Nathaniel Shaler, a distinguished scientist, and dean of the faculty at Harvard College, Cambridge, Mass: "Personally," he wrote, "I value what I have been so fortunate as to gain of acquaintance with very diverse sorts of men more highly than all else that I have won in the way of knowledge." That is a summary of Dr. Shaler's life-work in his own words. The acquaintance with the talented and learned men of his time he estimated worth more than money or knowledge even.

—J. A. WALKER.

Graphite.

Vol. VIII. SEPTEMBER, 1906. No. 9.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



CAPTAINS OF INDUSTRY.

When Will They Be Fully Appreciated?

As we have before remarked, writers to the Dixon Company often depart from the usual stiff business letter with the result that their letters become of especial interest to us and frequently to outsiders.

The following is taken from a letter written by a gentleman in Arkansas, to our Educational Department.

"Your unusual polite letter of July 5th received and read with great pleasure. It is usually the case that large concerns like yours are stiff, cold and repulsively 'dignified' in their correspondence. Yours is one of the attractive kind which manifests the true American spirit rather than ugly pomposity which belongs to absolute monarchies.

"Let me thank you for the interesting sketch of the life of Mr. Dixon. There is no lack of eulogy and excessive honor paid in literature to the heroes of war and bloodshed that is little if any better than wholesale murder. Such men are usually destroyers of the useful things produced in times of peace by the quiet and little known toilers and manufacturers of the world.

"I often wonder when justice will be done to the heroes of peaceful and useful pursuits, like Mr. Joseph Dixon and many others like him.

"The models ever set before the boys and girls in school are the histories of fighters, but the records of the past treat the achievements of the peaceful producers of useful things with almost silent scorn.

"I think of the simple, cheap and exceedingly useful little article—the lead pencil—as one case. Who invented it? How interesting would be the history of his struggles and those of others that we might have that most popular thing —the lead pencil!

"How much better would be the inspiration of the lives of such for the boys and girls in school than the intrigues and treacheries and bloody acts of those heroes, called warriors.

"To be sure, some noble men have been warriors, but they were noble not because they went through bloody scenes, but because they loved the right."

Catharine, N. Y.

Folder with pencil received. I think the pencil is all that could be desired in a pencil of the kind, and will recommend it to my friends.

Thanking you for the favor, I am, F. BELLE LYON.

NOT FOR THE NEWSPAPER MEN, BUT FOR US.

How Kind! Are They Philanthropists?

We have before us a very personal letter and a very fetching circular which takes up the matter where the letter leaves off. The letter tells us that the concern has set aside $50,000, which is not "to go into the pockets of newspaper men," but which is "all coming our way." We are not to get our part in cash but in a "premium." We are simply to give an order for fifty pounds of belt dressing at thirty-five cents per pound and we get the belt dressing and "an elegant twenty year gold watch and chain, which will be accompanied by a legally executed guarantee contract." Moreover, we are given sixty days credit, and if after thirty days' trial we do not like the deal we can return the goods and the premium.

Now, as we manufacture just the best belt dressing that we know of, we cannot with a good grace avail ourselves of this "snap," so our part of that $50,000 must go elsewhere. We suggest that one of our newspaper friends "whip the devil around the stump" and get a gold watch in his pocket, even if he is denied the cash.

THE USE OF GRAPHITE.

The latest issue of GRAPHITE contains much of general interest and distinct value to all in any way interested in that remarkable material. It is issued by the Joseph Dixon Crucible Company, Jersey City, N. J., "in the interest of Dixon's graphite productions, and for the purpose of establishing a better understanding in regard to the different forms of graphite and their respective uses." This great company, the name of which has popularly become a synonym almost for the word graphite, is the most extensive concern of its kind in the world, being represented in the greater portion of its leading cities. The company are miners, importers and manufacturers of graphite, plumbago and black lead, and that on most extensive lines. To enumerate the various uses to which these products are adapted and applied would alone transcend our space. If one needs any form of graphite the name "Dixon" on the package is a guaranty of its excellence.

—*The American Contractor.*

WHO WAS THE BOSS?

Our Pipe Joint Compound salesman, calling the other day on a plumber, was told by the proprietor that his "darned plumbers" (as he styled them) would'nt use what he, the proprietor, wanted used.

That being so, who in that shop was "Boss?" The owner or the men?—JOHN A. WALKER.

ESTABLISHED 1827. **INCORPORATED 1868.**

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

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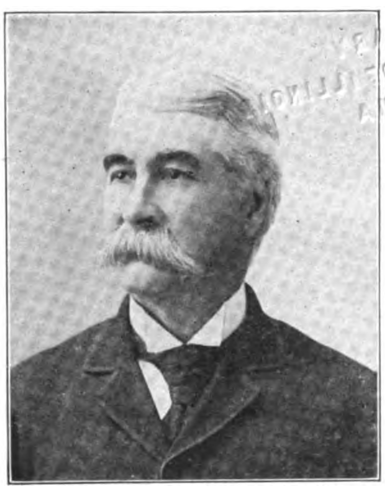
JERSEY CITY, N. J., September, 1906.



GEORGE G. McLEAN.

The present success of the Educational Department of the Joseph Dixon Crucible Company is due entirely to the foundation work laid by one man, and that one man is Mr. George G. McLean, now of Portland, Conn.

Mr. McLean is a native of New Britain, Conn., and has all his life been identified with business affairs connected with educational work. Mr. McLean is, as his picture well shows, a man of the vital temperament, full of love and affection, unhappy without congenial companionship, a man big in body and a man big in capacity for educational and thorough work. A man whom all have loved and continue to love who have had the pleasure of knowing him.

Mr. McLean was graduated from the State Normal School in 1858 and came to New York to teach in the public schools. He remained in New York City for some time and then went to Portland, Conn., and started a book and stationery store in Middletown, which is on the Connecticut River, just across from Portland. He was successful in this business, as he has been in all that he has undertaken, and it was while engaged in the stationery business that he became acquainted with the value and the possibilities in school work of the Joseph Dixon Company's American Graphite Lead Pencils. As time went on he gradually devoted his entire efforts to selling Dixon's Pencils.

After a few years Mr. McLean disposed of his stationery business, and still having his old-time fondness for teaching and school work, he began teaching in the High School in Middletown the children of the generation that he had taught when first he began his educational work.

Still later Mr. McLean abandoned the field of teaching and connected himself with the Joseph Dixon Crucible Company and organized the Educational Department of the Dixon Company for the introduction of Dixon's American Graphite Pencils into all of the schools throughout the country. He traveled extensively through the Middle West and Central States, interviewing superintendents of schools, superintendents of drawing, and teachers generally, and later on, when in the larger cities the purchasing power passed from the teachers to the city officials, Mr. McLean began his educational work with the various city officials, who were not already thoroughly posted as to the peculiar value of Dixon's Pencils for school work.

After a time Mr. McLean found it necessary to have additional help in his department, and he then gradually began to confine his practice to New York State and New England. Mr. McLean has been with the Dixon Company for twenty-seven years. He does very little traveling now but takes active interest in the business. At his age, 69, he feels that he is entitled to a rest. The success that the Dixon's Company has had in the past, and its present reputation among school people and those connected with educational work all over the country, is entirely owing to the work he started so well many years ago.

RUST IS DESTRUCTIVE, PAINT PRESERVES.

The best time for painting or repainting is early spring or fall. At such times the paint is not exposed to the hot and burning rays of the sun and the linseed oil, which is the best known vehicle for any paint pigment, is enabled to dry slowly and become the tough, leathery substance as it should.

Dixon's Silica-Graphite Paint is the acknowledged pioneer, leader and standard among carbon paints, and to carbon paints alone we look for the greatest durability and fullest protection.

For all kinds of metal and wood work requiring protection from rust and decay we unhesitatingly recommend Dixon's Silica-Graphite Paint. For durability, beauty and economy it is unequaled.

THE MAN WHO FALLS OVERBOARD.

A big business is a steamboat bound for a port called Success. It takes a large force of men to operate this boat. Eternal vigilance is not only the price of liberty, but is the price of every other good thing, including steamboating.

To keep this steamship moving, the captain requires the assistance of hundreds of people who have a singleness of aim—one purpose—a desire to do the right thing and the best thing in order that the ship shall move steadily, surely and safely on her course.

Curiously enough, there are men constantly falling overboard. These folks who fall overboard are always cautioned to keep away from dangerous places, still there are those who delight in taking risks. These individuals who fall off and cling to floating spars, or are picked up by passing craft, usually declare that they were "discharged." They say the captain or mate or their comrades had it in for them.

I am inclined to think that no man was ever "discharged" from a successful concern—he discharges himself.

When a man quits his work, say, oiling the engine or scrubbing the deck, and leans over the side, calling to outsiders, explaining what a bum boat he is aboard of, how bad the food is, and what a fool there is for a captain, he gradually loosens his hold until he falls into the yeasty deep. There is no one to blame but himself, yet probably you will have hard work to make him understand this little point.

When a man is told to do a certain thing and there leaps to his lips or even his heart the formula, "I wasn't hired to do that," he is standing upon a greased plank that inclines toward the sea. When the plank is tilted to a proper angle, he goes to Davy Jones' locker, and nobody tilts the fatal plank but the man himself.

And the way this plank is tilted is this: the man takes more interest in passing craft and what is going on on land, than in doing his work on board ship.

So I repeat: no man employed by a successful concern was ever discharged. Those who fall overboard get on the greased plank and then give it a tilt to starboard.

If you are on the greased plank you had better get off from it and quickly, too.

Loyalty is the thing—faith.—ELBERT HUBBARD.

"THE NEW LUBRICANT."

We have mentioned in a previous issue of GRAPHITE the Chapman Automatic Graphite Cylinder Lubricator, and later on we shall have quite a little more to say concerning it and also shall show illustrations.

In brief, the Chapman Automatic Graphite Cylinder Lubricator is a lubricator designed to feed Dixon's Pure Flake Graphite and cylinder oil, or cylinder oil only. It is intended for use on high pressure and superheated steam engines, blowing cylinders and gas engines. It feeds against any pressure and gives the graphite no chance to settle. It provides for instant variation of feed and is refilled without interrupting the lubrication. It delivers constant proportions of graphite and oil and handles any consistency of fluid lubricant.

For several months past a number of these lubricators have been delivering with marked success what is termed by the inventor "the new lubricant."

Of what the "new lubricant" consists we are not at the present time prepared to say further than that one of the most efficient of the ingredients is Dixon's Graphite.

The Chapman Lubricator and "the new lubricant" have been handled entirely by the London Branch of the Dixon Company. That branch reports to us that there has not been a single drawback since February, 1906, and that the most severe test is now to be made on an Allen Compound Exciter Engine. The exciter engine is run at 375 revolutions per minute, 180 pounds pressure, 100 degrees superheat.

The man in charge of this engine says that it is running sweeter than its sister is running on oil alone.

At the present time there are five of the Chapman Lubricators that are running with "the new lubricant," and all are running not only with entire success but with most marked advantages.

OVERLAY WORK.

As a good many readers of GRAPHITE are either publishers or have much to do with printing, it will be of interest to them to know that Dixon's No. 365 Crayon is spoken of very highly for overlay work.

Dixon's No. 365 is especially recommended for what is called rough overlay, and the results in its use are just what is wanted where large pages are to be marked out either for what is known as the first overlay or for an underlay to be placed under the plates from which is transmitted the impression. It is also especially recommended where newspapers are printed on flatbed presses.

In book work, after the first rough overlay has partially leveled up the impression and the pressman must get down to finer details, Dixon's Sketching Crayon No. 341 or Dixon's Operator Pencil is preferred by many to the No. 365 because of its finer and smaller point.

Dixon's No. 350 is also quite a favorite in newspaper work of this kind.

AMORPHOUS GRAPHITE VS. FLAKE GRAPHITE.

An Exhaustive Test by Professor W. F. M. Goss, of Purdue University, Lafayette, Ind., to Determine the Comparative Lubricating Value of the Finest and Choicest Amorphous Graphite and Dixon's Regular Flake Graphite.

As the attention of many engineers has been called to amorphous graphite by those advocating the use of amorphous graphite instead of flake graphite as a lubricant and as the Dixon Company has received letters of inquiry from engineers and others interested in the lubrication of machinery, inquiring as to the respective merits of amorphous graphite and flake graphite, the Dixon Company has thought it well not only to give its own experiences, but to also have an exhaustive test made by the well-known expert, Professor W. F. M. Goss, of Purdue University.

Engineers of some twenty-five years ago will recollect the prejudice that was met by the Dixon Company in the endeavor to market its flake graphite because of the poor results in the ordinary lubricating graphites of those days, which were chiefly more or less unrefined Ceylon graphite and the amorphous graphite, more commonly known as black-lead.

It may also be well to call the attention of the public to the fact the Dixon Company is the oldest house of the kind in the world, that it imported amorphous graphite of the best quality long before any other graphite company was born. That to-day it mines, imports and manufactures graphite of all kinds and if there was any special virtue as a lubricant in any graphite other than the famous Ticonderoga Flake Graphite, the Dixon Company would be the first to place such graphite on the market as lubricant.

Ticonderoga Flake Graphite has the special advantage of being a flake graphite of wonderful thinness of flake. Its other advantage over all other forms of graphite is its extreme toughness, smoothness, purity and freedom from grit of any kind. The impurity that is in it, if impurity it may be called, is of a micaceous nature, and mica is considered a very good lubricant. Hence, the impurity in Dixon's Ticonderoga Flake Graphite is not one that counts.

The Dixon Company submitted to Prof. Goss a package of Dixon's Flake Graphite marked "C" and a package of the very choicest amorphous graphite obtainable anywhere marked "E."

We quote from the Professor's report as follows:

Test of Plumbago C.

(Dixon's Flake Graphite.)

"In anticipation of the test the discs of the test machine were re-surfaced to make certain that graphite previously used was entirely removed. The rubbing surfaces were then scraped accurately to fit and were supplied with a lubricating mixture consisting of 4 per cent. Plumbago C and 96 per cent. kerosene. Thus lubricated the machine was operated at an average of 308 revolutions per minute with an initial pressure of 13 pounds per square inch, under which conditions a coefficient of friction of .01283 was developed. As the operation of the machine proceeded, the discs were removed from time to time and portions of the surface scraped in order to facilitate the action of wearing them down to a normal condition. Under this treatment, the friction gradually decreased until when 1,424,304 revolutions had been made no further reduction could be noticed.

After the coefficient of friction had become constant as a result of running 1,424,304 revolutions, the pressure per unit area was gradually increased from 13 pounds to 120 pounds per square inch. The minimum coefficient of friction was secured for a pressure of 90 pounds per square inch of surface. The value of this minimum coefficient of friction was .00288.

To determine the endurance of Plumbago C as a lubricant, all free plumbago was removed from the machine. The parts were carefully rinsed with gasoline, and the test surfaces were operated under a pressure of 100 pounds per square inch with kerosene as a lubricant. This process was continued for a period of six days, during which the machine made 806,936 revolutions. Through this period, the bearings exhibited no signs of distress. The coefficient of friction was at all times practically constant

The process of rinsing the parts with gasoline was to insure the removal of all free graphite. This cleansing process did not, however, disturb the graphitic coating upon the rubbing surfaces, but merely removed the loose or free particles."

Test of Plumbago E.

(Amorphous Graphite.)

"Plumbago E is a fine black powder. Its particles exhibit a tendency to adhere one to another and thus form small cakes or balls. It was found impracticable to ascertain its degree of fineness by shaking it through graduated sieves.

In preparation for the tests the discs of the testing machine were prepared as for previous samples by a careful scraping of the surfaces to insure perfect contact between the rubbing surfaces. The lubricating mixture, consisting of 4 per cent. plumbago E and 96 per cent. kerosene, was then applied and the machine operated at a speed of about 309 revolutions per minute and under a pressure of 20 pounds per square inch. Under these conditions an initial coefficient of friction of .0370 was developed. The average coefficient for the first 93,000 revolutions was .0348.

As the operation of the machine proceeded, the coefficient of friction decreased and from time to time the load upon the bearings was increased. The results, however, were accomplished much more slowly than in the preceding tests and the process of increasing the load could not be extended beyond the limit of 50 pounds pressure. The presence of plumbago E did not serve to improve the conditions of the bearing surface as had been found to be the case with the samples previously tested. On the other hand, the surfaces gradually deteriorated. Notwithstanding the light pressure employed, there was present at various times more or less cutting or abrasion of the metal composing the rubbing surfaces.

The maximum pressure of 50 pounds per square inch and the minimum coefficient of friction .00445 was obtained after the test had been extended to 1,130,647 revolutions. An attempt to increase the pressure to 60 pounds per square inch resulted in a rapid rise in temperature and a failure of the bearing to lubricate. Repeated attempts failed to disclose results which were more advantageous than these.

The conclusions to be drawn from these results are that plumbago E is of little value as a lubricant. It is far inferior to that of the samples previously tested."

In closing we desire only to add that Prof. Goss was furnished with five different samples, four were of foliated or flake graphite and the fifth, "Plumbago E," was "the new

graphite lubricant" claimed to be so much superior to flake graphite. These tests were made in the interest of graphite lubrication, that engineers, machinists, and others making use of graphite as a lubricant might know the comparative value of different forms of graphite.

Later on we shall publish the reports in full, giving diagrams, etc., and it will be seen that in each case foliated or flake graphites are superior to the choicest amorphous graphite as a lubricant. Amorphous graphite should not, however, because of its physical structure, be expected to prove as good a lubricant as thin flakes of soft graphite.

We quote from the Professor's report as follows:

"Putting the results of this test in the simplest form, it is sufficient to say that when the amorphous graphite is used the friction is three times as great under light loads and about twice as great under heavy loads as when flake graphite is employed. The fact that when amorphous graphite was used the pressure could not be carried above 60 pounds without serious heating, shows clearly that the flake graphite does persistently attach itself to the frictional surfaces."

Later on we shall issue a pamphlet with a very full report of the results of the tests made by Prof. Goss, showing the machine which was especially made for testing graphite, and cards showing co-efficiency at different pressures and speeds.

The Dixon Company also have on the press the tenth edition of "Graphite as a Lubricant" which will not only be of interest to every engineer and official having charge of motor departments, but will be equally interesting as a text book on graphite lubrication.

STEAM TRAPS.

By W. H. Wakeman.

Chapter IV.

Various catalogues, used to illustrate steam machinery and appliances, contain statements that are at least surprising to well-informed engineers. Take the following as a example: "Statistics show that 85% of the energy of fuel is wasted. When you pay your coal bill you merely get 15 cents on the dollar. The greatest enemy to the economical utilization of steam is water. Hence it is an imperative necessity to dispose of it quickly." This statement is made in connection with the use of steam traps.

Of course, there are different ways of using and wasting steam, also various ways of calculating the same, but what conditions could possibly be found under which only 15% of the value of steam would be used? We note that the great enemy is water, but are not told just how this bogus friend accomplishes these results. It is a well known fact that some plants are heated by water only, and they are considered economical.

There are many plants in operation using a boiler pressure of 80 pounds. This steam is used in engines and pumps, after which it goes into heating systems where it is reduced to water at a temperature of about 200 degrees. If there is not enough steam coming in this way, it is supplied directly from the boilers through one or more reducing valves.

The total heat of steam at 80 pounds gage pressure is about 1,212, and as the temperature of returning water is 200 degrees, it leaves 1,212—200=1,012 heat units to be supplied by the coal used. Ten pounds of this water is turned into steam by each pound of coal burned, therefore 1,012 × 10=10,120 heat units are accounted for from each pound of coal burned. Coal that contains 14,000 heat units per pound is considered a very fair grade, then 10,120÷14,000=.72. In other words, 72% of this coal is actually utilized, which is an important advance over the 15% just mentioned.

Much of the remaining 28% is used in creating chimney draft, or is lost through boiler settings out of repair. Even this shows a wasteful condition of affairs, but there is no necessity for exaggerating the facts which are well known to engineers.

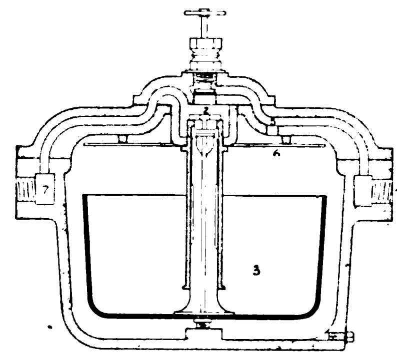


FIG 19

Fig. 19 illustrates a trap in which the outlet valve *2* is open as long as the bucket *3* is in the position shown. Hot water enters at *4* and as the valve on top of the cover is closed, it goes through the inlet *5* and falls upon the deflecting plate *6*, which prevents it from falling directly into the bucket. It fills the lower part of the trap and, rising, lifts the bucket *3* until the valve *2* is closed. As it continues to come it overflows into the bucket and causes it to sink, thus opening the outlet valve *2* and quickly discharging water through the passage *7*.

Several traps have now been described in which a bucket made of cast iron is used to open and close one or more valves for the purpose of disposing of accumulated water. These buckets are as good as any other known device for this purpose, but they must be very thin in order to be light enough to float in water, consequently if one of them is cracked by rough usage in carting, or by uneven contraction and expansion in service, it will not hold water, hence becomes useless.

On many of the traps already shown and described, a glass water-gage is provided for the purpose of showing how much water is present, and whether the internal mechanism is operating to good advantage. Whether gages are beneficial or not may be an open question, or at least whether the good points overbalance the bad ones, but if there is one on a trap it is an easy matter to shut it off if not wanted, therefore on general principles it is well for an engineer to take all that is offered in this way, then if some of the extras are not required every day he can let them remain out of service.

The objections to a water-gage are that it takes time to keep it clean, replace broken glasses, and when a glass breaks in an out-of-the-way place, (as many traps must be located where they are seldom seen), it may discharge steam and hot

water for some time, causing damage to machines, belts, &c., before it is discovered. The advantage secured by use of them is that it is possible to tell at a glance whether a trap that is so equipped is working well or not.

If a stationary trap is not fitted with a water-gage it is possible in some cases to detect failure to operate, after an

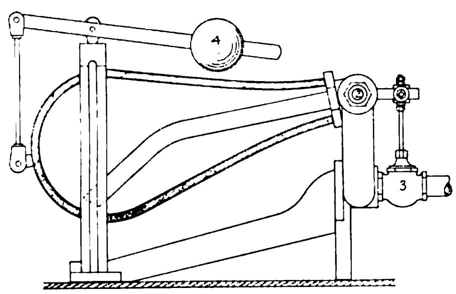


FIG 20

engineer has had experience with that particular kind of trap, but when a tilting trap is adopted its actual condition can be determined at any time. Fig. 20 belongs to this class, as the pear-shaped bowl is hinged at *2*, and while in the position shown the outlet valve *3* is closed. Water is now running into the trap, but the weight *4* is still sufficient to hold the bowl in position. When this is nearly full of water its weight overcomes the leverage of the ball and the large end of the bowl falls to its lower position. This opens the discharge valve *3* and water is quickly discharged.

This may be classed as a continuous discharge trap, so far as taking water from a heating system is concerned, for when the bowl is up as shown, it takes water freely, then as it fills and goes down the discharge valve opens, but there is no other valve to close at this time, therefore water from the system can go directly out of the discharge valve *3*.

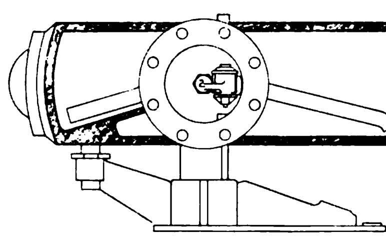


FIG 21

Fig. 21 is another specimen of the tilting traps. It is hinged at *2*, but this is not at the center, as one part is longer than the other. Water enters through a trunnion on one side and escapes through another on the opposite side. So far as metal in this trap is concerned, the shorter end is heavier than the other, hence when empty it stands in the position shown.

When water comes in it flows to the left hand or shorter end, holding it in this position until water enough has accumulated to cover the shelf, then it overflows and goes to the right hand or longer end. Here the greater leverage causes the body of trap to tilt, throwing the right hand end down, the immediate effect of which is to throw water from the left to the right hand end, giving a greater leverage to open the discharge valve, and as pressure acts on all water surface it is quickly forced out through the discharge trunnion.

Fig. 22 operates on a principle that is entirely different from those already explained in this articles. The diaphragm *2* is made of phosphor bronze and partly filled with a peculiar fluid, the composition of which is a trade secret. When heated this fluid flashes into a vapor, the expansive

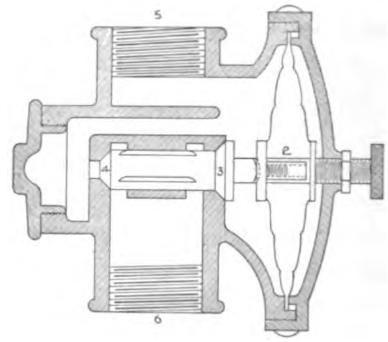


FIG 22

force of which is great. When in this condition it is adjusted to hold the balanced double valve to its seats at *3* and *4*, thus preventing the passage of steam through it. When cooled the vapor returns to a fluid, thus contracting and being greatly reduced in volume, creating a partial vacuum in the diaphragm, the effect is to draw the valve stem out and open the valve.

In practice this operates as follows: The drip pipe from a heating system is connected to *5*, and *6* is the outlet from trap. When cold the valve is open, therefore as steam is first turned on, the air and cold water which is usually discharged first passes through freely, but when warm water and then steam comes, the resulting heat expands the diaphragm *2* and the valve is at once closed as seen in the illustration, thus preventing the escape of steam. When water collects in the trap again, the diaphragm opens the balanced valve and the process is repeated.

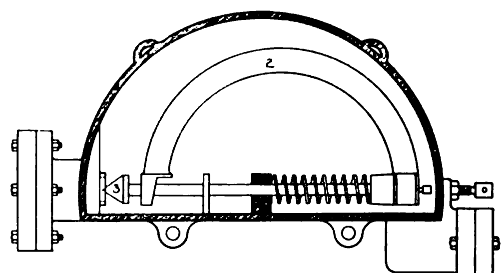


FIG 23

Another trap which is operated by the expansion and contraction of fluid is shown in Fig. 23. It is contained in the curved tube *2* and when heat imparted by steam strikes it, expansion takes place at once and the valve *3* is closed. When water collects in the trap, contraction opens the valve and the process is repeated as long as steam is on the heating system.

Fig. 24 is still another trap that is operated by expansion and contraction, but in a different way from those just described. The body of this trap consists of two pieces of brass pipe *2* and *3*, screwed into a tee *4* which also supports the valve *5*. Each end of the brass pipe carries a coupling with a yoke, *6* and *7*. On each side of the body of the trap there is a curved rod, only one of which is seen in the illustration at *8*.

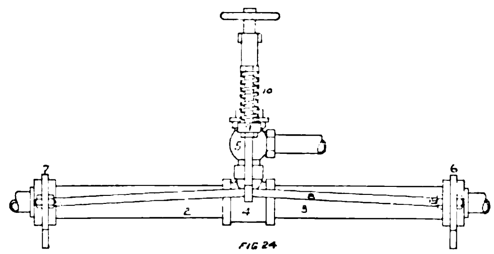


FIG 24

When steam heats the body of this trap at *2, 3* and *4* it expands, the effect of which is to draw *9* downward against the tension of the coiled spring *10*. This action closes the valve and shuts off steam. As water collects the trap cools and contracts, thus allowing the spring *10* to open the valve and let the water out.

There is one point in connection with all traps operated by expansion and contraction, to which special attention is called, as failure to observe it has caused much trouble.

Do not locate one of these traps near a steam pipe belonging to the system to be drained, or to any other system, as heat from it will keep the trap warm and consequently expanded, preventing it from operating well. Always locate such a trap in as cool a place as practical and it will do good work.

Every trap ought to be painted with a kind of paint that will stand the severe test of changing temperature, as the nature of the work calls for these changes, therefore they ought to be covered with two coats of Dixon's Silica-Graphite Paint.

This concludes our description of steam traps, including the float bucket, tilting and expansion types, which it is hoped will prove both interesting and instructive to those who have not given this subject the attention due to its importance.

GRAPHITE.

You know how small bits of paper, like the familiar confetti, resist the most patient sweeping, and how strongly they adhere to the floor and fill the cracks and crevices; well, that's pretty much the way that graphite adheres to metal surfaces. The flakes of graphite have much the same proportions as confetti, only very much smaller, their thickness being probably less than three ten-thousandths of an inch. The covering power of a given quantity of flake graphite, it would seem, would greatly exceed that of the same quantity of amorphous graphite, which is made of irregular granular particles, just as the leaves of a pad would cover a greater area and more smoothly and evenly than the same pad cut into little irregular chunks.

Friction is due to the inability of human skill to produce perfectly smooth surfaces, and no matter how smooth a metal surface may appear to the naked eye, it will always be found rough when examined under the miscroscope. These roughness of rubbing surfaces interlock and resist free motion, i. e., cause friction, resulting in wear, over-heating and "cutting."

When flake graphite is introduced into a bearing it soon fills up all the pores and irregularities of the metals, imparting a glaze or veneer of marvelous smoothness and high polish. Reduced friction follows such a perfection of bearing surfaces, and there is less heating, less wear, and "cutting" is absolutely impossible. Less oil need then be used and even better results obtained, and in no class of machinery is this important feature more appreciated than in the cylinders of automobiles.

The graphite glaze on cylinder walls means better piston fit with less friction and no cutting, rusting or "freezing" of the piston. Flake graphite greatly increases the efficiency of any oil or grease for the lubrication of main bearings, gears, cams, slides and axles, and is the ideal lubricant for driving chains, preventing wear and noise and doing away with the necessity of a greasy chain, which always catches dust and sand. For such purposes the graphite is best combined with a firm wax or fat, which is melted and in which the chain is immersed until the graphite reaches every pivot. —*Automobile Magazine.*

WHY DID THE MAN DO IT?

A Man Lends a Pencil and When It Was Returned Throws It Away.

Two men, one carrying a book, the other a bundle of papers, were neighbors in an elevated train. The man with the papers wished to write, but he had no pencil. He asked the man with the book to lend him one. Silently the bookish man drew a long black pencil from his pocket and passed it over. For fifteen minutes the owner of the manuscript labored diligently. When the train neared Eighth street he handed the pencil back. Again the other man said nothing. He took the pencil, raised the window and threw the pencil out on the tracks. The industrious man turned very red.

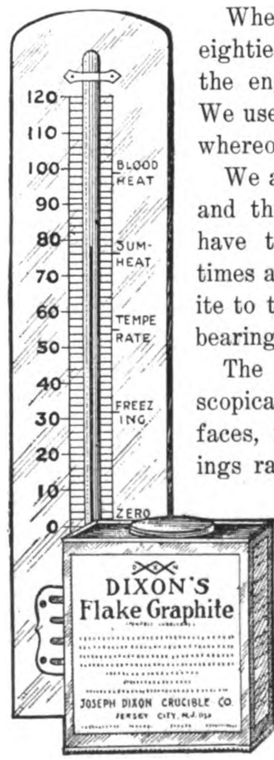
"Great Cæsar!" he exclaimed, "What did you do that for?"

"I never use a pencil that anybody else has used," said the man with the book.

Then he stumped down to the door and left the car.

"Well," growled the borrower, "if he was going to throw it away he might at least have had the decency to wait till he got where I couldn't see him."—*The N. Y. Sun.*

HOT WEATHER—HOT BEARINGS.



When the thermometer gets up near the eighties out of doors and in the shade, then the engineer is sure to have hot bearings. We use the word "sure" because we know whereof we speak.

We are running two large Corliss engines and things get hot and bearing surfaces have to be carefully watched. At such times a teaspoonful of Dixon's Flake Graphite to the pint of oil, fed to cylinders and bearings, has a marked cooling effect.

The flake graphite fills up the miscroscopical irregularities of the bearing surfaces, making graphite to graphite bearings rather than metal to metal bearings. With this increased smoothness of surfaces the oil is able to give better results.

In MUGGY, sticky and damp weather when doors, drawers and things generally bind and jam,—try flake graphite. Rub it in well. The results will please you.

HOW IS THIS FOR PROGRESS?

The Earl of Chatham said about 150 years ago that the American Colonists had no right to manufacture so much as a horse nail.

In 1750 law forbad in America the erection of an iron rolling mill.

In 1780 even Benjamin Franklin, usually forsighted, said America will not make manufactures enough for her own consumption in 1000 years.

Sir Charles Napier said he would not command a steam propelled navy, as he didn't want to be boiled alive.

Lord Stanley said if steamships cross the Atlantic I will eat the boiler of the first boat that arrives.

Sir Humphrey Davy said it was as reasonable to talk of ventilating London with windmills as to light the big city with gas.

When Fulton's first steamer went up the Hudson the date was the 17th of August and the preachers of the time cursed the boat on the ground that the date was the total of the ten horns and the seven heads of the beast of Apocalypse.

As late as 1830 instruction in natural science was only to be had in colleges designed exclusively to train professional men.

By 1830 John Fitch, Oliver Evans and Robert Fulton had demonstrated the function of steam for land and water travel.

Whittemore had started his carving machine and Morse the electric telegraph. One year Harvard graduated only seven, whereas in 1906 she conferred 1073 degrees.

To-day the American crops total a value of $5000,000,000, and after supplying our own 90,000,000 with manufactured goods we have left over $400,000,000 for export.

A clever machine is now ready to accomplish every mechanical detail.

Horse-power costs only ⅓ of the coal it cost thirty years ago. In 1814 Daniel Webster said: "I am not in haste to see Sheffield and Birmingham in America," and in 1906 America has one corporation doing as much business as either the whole of Sheffield or Birmingham.—J. A. WALKER.

ONE WAY OF SEEING IT.

Last February one of the Dixon salesmen sold the superintendent of a Water Works Company twenty-five pounds of Dixon's Graphite Waterproof Grease. Some days ago our salesman called again and this is what the superintendent said: "I have no use for Dixon's Waterproof Grease. One application of it eight or ten weeks ago did more good than everything else I ever used constantly before. Its action is magnificent."

THE READING HABIT.

The reading habit is easy to acquire and is of importance enough to be called invaluable. In no other way can a man so quickly duplicate or triplicate himself and be two or three men instead of one man. Of course, we hear it said, "what do these bookmen know?" but while they all don't some of them do, and a part of the reader's duty is to select trustworthy books.

A man, for instance, is running a boiler with no true appreciation of its limits, so he burns more coal than he ought. He gets fewer heat units than he should, he lives in a secluded town, never has a chance to see the big world of industry—never or seldom meets one of his guild and so jogs on, trots on at his slow, wasteful gait, never disturbed in his self-complacency. Now, if such a man had the reading habit, he could get a book where the writer tells him what he, the book-writer, has done or seen done elsewhere, where less fuel is burned, more heat obtained and in this way he might be disturbed in his slow jog-trot way, and spry up and get his boiler up to better efficiency, and so on through the whole world of industry. The world would be back to semi-barbarism without its record, and good books are chiefly what one or another observing man has seen and noted down.—J. A. WALKER.

JANE JONES.

Jane Jones keeps a whisperin' to me all the time,
An' says: "Why don't you make it a rule
To study your lessons, an' work hard an' learn,
An' never be absent from school?
Remember the story of Elihu Burritt,
How he clumb up to the top;
Got all the knowledge 'at he ever had
Down in the blacksmithing shop."
Jane Jones she honestly said it was so.
Mebbe he did—I dunno,
'Course what's a-keepin' me 'way from the top
Is not never havin' no blacksmithin' shop.

She said 'at Ben Franklin was awfully poor,
But full o' ambition and brains,
An' studied philosophy all his hull life—
An' see what he got for his pains.
He brought electricity out of the sky
With a kite an' the lightnin' an' key,
So we're owin' him mor'n any one else
Fer all the bright lights 'at we see;
Jane Jones she actually said it was so.
Mebbe he did—I dunno;
'Course what's allers been hinderin' me
Is not havin' any kite, lightnin' or key.

Jane Jones said Columbus was out on the knees
When he first thought up his big scheme;
An' all of the Spaniards an' Italians too,
They laughed an' just said t'was a dream;
But Queen Isabella she listened to him,
And pawned all her jewels o' worth,
An' bought him the Santa Marier an' said;
"Go hunt up the rest of the earth."
Jane Jones she honestly said it was so;
Mebbe he did—I dunno;
'Course that may all be, but you must allow
There ain't any land to discover just now.

—*Southern Magazine.*

A diamond burning in the electric arc was lately exhibited on a screen by Sir William Crookes. The stone could be seen to sprout and swell and blacken under the intense heat until nothing remained but a swollen lump of graphite

—*American Cultivator.*

HOW TO TELL IF A GREASE OR OIL CONTAINS GRAPHITE.

Of late we have frequently been asked if there is any method of telling whether a so-called graphite grease or oil contains graphite.

We know of no method more simple or more thorough than to take a small quantity of any such grease or oil and put it on white blotting paper. The blotting paper will absorb the oil or grease while the graphite will remain on the outside.

To hasten the matter the oil or grease may be rubbed into the blotting paper with the finger.

Another way is to use a piece of filtering paper and if necessary warm the oil or grease. The paper will filter out the oil or grease and leave behind the graphite.

By this method it would be determined just how much graphite the oil or grease contains and it would also be determined whether the graphite is the flake or amorphous graphite, and often it would be determined if the oil or grease contains impure or gritty graphite.

"GRAPHITE."

It is a matter of great satisfaction to the Dixon Company that it has been able to make its house organ GRAPHITE of interest enough to secure the approbation of several libraries and technical institutions.

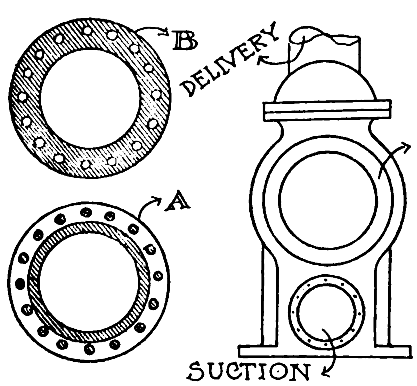
It has been a pleasure and will continue to be a pleasure to the Dixon Company to send regular copies of GRAPHITE to all who are interested in graphite lubrication or graphite products.

Graphite, especially the foliated or flake graphite, has been coming into larger and larger use each year. In the matter of lubrication it is bound at a no great distant day to play a vastly more important part than it does even at the present time, when it is recognized to be almost indispensable for the lubrication of engines using superheated steam, and for bearings very generally.

The theory of graphite lubrication is very simple. Graphite fills up the microscopic irregularities of the bearing surfaces, making a graphite-to-graphite bearing instead of a metal-to-metal bearing. Furthermore, graphite is not affected by heat, acids or alkalies.

GASKETS FOR CYLINDER HEADS.

Cylinder head gaskets sometimes have a frayed or chewed appearance after being in use a short time, due to a breath-



ing action or movement of the cylinder head outward, which action permits water to escape between the gasket and head.

If a gasket similar to the one shown at B in the illustration is made, treated to a coating of graphite and cylinder oil and inserted in place, a water-tight joint will result, says the *National Engineer*, even though the breathing action of the cylinder head continues. The method of applying the gasket is shown at A.

GRAPHITE FOR AUTOMOBILE WHEELS.

Sometimes, says *Automobile Topics*, the rims of the wheels of the automobile, when the cover is removed, will be found to be rusty. The rims should be well cleaned and painted or rubbed with finely powdered graphite, otherwise the inner tube will suffer.

Dixon's No. 635 Graphite, or Dixon's Motor Graphite will be found admirable for this purpose. The graphite may be rubbed on dry or it may be mixed with gasoline to the consistency of cream and applied as a paint. The gasoline will very quickly evaporate, leaving a thin, smooth coating of graphite.

GRAPHITE AS A LUBRICANT.

Tenth Edition.

The tenth edition of "Graphite as a Lubricant" contains much of the matter that appeared in the ninth edition and also some new and interesting matter on the subject of graphite as a lubricant. On request copies will be sent free of charge to anyone interested.

A NIGHTMARE IN HARDWARE.

Anonymous.

To-day I drove the pigs of lead
  Down where the tailor's goose
Was drinking from the old spring-bed,
  As was its wont and use.

The sad-iron stood in sorrow by;
  The weight had lost its scales,
But the harrow showed its grinning teeth,
  And the keg its tenpenny nails.

The auger cried, "Life's one long bore;"
  The plow said, "I've my share;"
The copper whispered, "All is ore;"
  And the hair-spring tore its hair.

Though the monkey wrenched nut after nut
  From the rods that tried to bolt;
Though the cross-cut saw bad-tempered got,
  Seeing the *stop-cocks molt.*

No game the chains put on their links,
  Where the planes were smooth as glass;
A heaviness fell on the zincs,
  A dulness on the *brass.*

What strange, hardwaring sights there be;
  The jack-screw turned away,
A saving thought came unto me—
  I need not weight to-day.

The thing I could not understand;
  I turned my *pigs of lead,*
And drove them with an *iron* hand
  Back to the *smelting shed.*

—*Exchange.*

And now the pigs had reached their goal
  The shanks and pots stood ready for the fun,
A lot of talk, a little coal,
  Presto! the pigs are Babbitt, number one.

—A. L. Haasis.

AN OFFICIAL ENDORSEMENT.

The Hartford Steam Boiler Inspection and Insurance Company Recommend Mud Drums to be Thoroughly Cleaned and Painted with Graphite to Prevent Corrosion.

For many years we have recommended the treatment of mud drums with graphite for the prevention of corrosion, and we have some nice testimonials concerning the value of painting the steam space in mud drums with Dixon's Graphite Paint.

Some wide-awake engineers discovered the value of graphite for mud drums and used it in various ways. Some engineers make use of the regular flake graphite mixed with linseed oil, others use it mixed with any oil or grease, others simply clean the mud drums thoroughly and rub dry graphite in. All methods have been good, some more useful than others. The Hartford Steam Boiler Inspection and Insurance Company have officially recommended that the steam space and mud drums of boilers be thoroughly cleaned and painted with graphite to prevent corrosion. They do not recommend any special method of application further than that the drums should be thoroughly cleaned and then graphite rubbed in thoroughly while the drum is drying, the same as one would use stove polish, and then, if possible, apply a coating of graphite paint.

The Dixon method is to rub the graphite in in the form of stove polish, that is, mix the graphite up with a little water or oil to a thick paste and then apply and rub in well, afterward the graphite can be mixed with linseed oil and applied in the form of a graphite paint.

If the engineer has, as he should have, a package of Dixon's Boiler Front and Smoke Stack Paint, he will find that really the best method is to apply this paint to the mud drum after it is thoroughly cleaned.

PHILOSOPHICAL DR. HALE.

In his "Memories of a Hundred Years" that distinguished New Englander, Dr. Edward Everett Hale, says of Edward Everett that he was hopelessly sensitive to what the press printed, "not knowing what I, who was bred in a newspaper office, know: First, that of whatever is put in the newspaper half the people who see it do not read it; second, that half of those do not understand it; third, that of the half who understand it half do not believe it; fourth, that of the half who believe it fully half forget it; fifth, that the half who remember it are probably of no great account, anyway."

216 West 28th Street, Los Angeles, Cal.

Your Dixon's 'Eterno' No. 2050 was duly received and I will say that it has proved to be the best pencil of the kind I have ever used, and I have used many. W. R. GILSON.

ARE WE BEHINDHAND,

And Do Our English Cousins More Fully Appreciate the Importance of Better Lubrication?

Sometimes we have thought that engineers and users of machinery abroad, especially in England, France and Germany, were more particular in regard to lubrication than the same class of people in the United States.

Possibly they may more fully recognize the importance of lubricating the moving parts of machinery, or have more time to look after it than we do here in America.

Certain it is that in the matter of Dixon's Graphite Compound for lubricating motor chains we sell probably twenty-five cakes of it through our London Branch where one cake is sold in America.

The importance of perfect lubrication is shown in a statement made in a technical paper a short time ago, to the intent that nine-tenths of all the machines that have been made second-hand were excessively worn in the bearings because of neglect in lubrication.

The following extract is from *Motor Traction:* "In the discussion of Mr. J. W. G. Brooke's paper on the 'Theory and Practice of Lubrication,' read before the British Auto Cycle Club recently, Mr. G. de la Prelle de Nieppe, Chief Engineer of the London Road Car Co., made some instructive remarks upon the lubrication of motor 'buses. Speaking with regard to the driving chains of his 65 Straker-Squire 'buses, he said he used graphite for chain lubrication, and found that the life of the chain was four times as long as formerly. He boiled the chain for two minutes in a special composition made by the Dixon Crucible Company and let it dry, and then boiled it again a second and third time. He never put any on the outside, but let it get into the links. The chain would run absolutely smoothly, and he could tell one of his omnibuses from others by the noise of the chains alone."

Messrs. Moss & Wood, of London, England, builders of the well known "Orion" Motor Buss, write the following to our London office:

"Dear Sirs: In reply to your inquiry we have great pleasure in stating that after 12,500 miles running we have had some Renolds chains examined by the makers. They write to say the cleaning and lubricating has undoubtedly contributed to the good service they have done. Now considering that Dixon's Chain Compound and Waterproof Grease were used exclusively on these chains, we think you can hardly ask for a better recommendation."

The following is a letter in full from Chief Engineer G. de la Prelle de Nieppe:

"Gentlemen: I am so satisfied with Dixon's Graphite that I cannot refrain from writing you these few lines. I have employed this product in two different cases:

1. Upon the chains of the 68 omnibuses which I am running in London.
2. In the change gear boxes of these vehicles.

I have increased the life of my chains, which make 120 miles a day, by about 17 days. Formerly the chains were past their work in six weeks, they now last for two months and are less worn. The bearings of the change gear boxes work well with this product and are in a wonderfully good condition.

With regard to the shafts, they are polished and show no signs of wear. I cannot too highly recommend this product to all chauffeurs, for I can safely say that after six months of constant usage of this product that it is absolutely perfect for all rotating parts of automobiles.

I beg to accept the expression of my most distinguished sentiments."

ABRAHAM LINCOLN'S LETTER TO MRS. BIXBY.

The Lincoln Trust Company are sending out a card for hanging in the office, on which is printed in large type, "Abraham Lincoln's Letter to Mrs. Bixby." It is dated from the Executive Mansion, Washington, Nov. 21, 1864 (over 41 years ago.) It is as follows:

MRS. BIXBY, Boston, Mass.

Dear Madam: I have been shown, in the files of the War Department, a statement of the Adjutant General of Massachusetts that you are the mother of five sons who have died gloriously on the field of battle. I feel how weak and fruitless must be any words of mine which attempt to beguile you from the grief of a loss so overwhelming, but I cannot refrain from tendering you the consolation that may be found in the thanks of the Republic they died to save. I pray that our Heavenly Father may assuage the anguish of your bereavement and leave you only cherished memory of the loved and lost, and the solemn pride that must be yours to have laid so costly a sacrifice upon the altar of freedom.

Yours very sincerely and respectfully,

ABRAHAM LINCOLN.

HE IS A BRIDEGROOM, AND VERY LOVING BUT BASHFUL.

Is Out of Work and Wants to Get Married.

The following is our latest in the way of unusual correspondence:

"Yesterday in the afternoon I was in your office but I could not speak with nobody. Please if you have some work in your manufactory take me up to be your laborer, I should like any work. I am a bridegroom and I cannot get married before I have any work and I am very loving, I am without work for 6 weeks."

Many automobiles are discarded long before their time, with ruined bearings and "general debility"—just for lack of a little lubrication. The most effective lubricator for motor machinery is graphite. It is surer and much more lasting than oils or oil compounds, because it does not run or drip off, nor does it evaporate as oils do when heated. Graphite makes a thin coating right where it is most needed. This acts as a filmy cushion that keeps the expensive surfaces and bearings from rubbing and wearing each other. Flake graphite, composed of thin flakes or layers, is the best kind of graphite for motors, as it does not get "caked" or "balled" up, nor does it gum or clog their intricate mechanism.

—*Evening Post, N. Y.*

Southern Pines, N. C.

After trial of the 'Eterno' pencil you sent me, I find it *most practical* for general use, and that it perfectly fulfills all the claims you make in its behalf. In short, it is a *mighty good pencil.*

C. L. MOREHANN.

"DAILY STUDY HABIT."

Our Vice President and General Manager, Mr. John A. Walker, sends us the following which is clipped from *Science*. Mr. Walker has always, so far as we can learn, had the "daily study habit." Now while he is at his summer cottage away up in the Adirondacks, he is evidently still keeping close to his books as well as close to Nature.

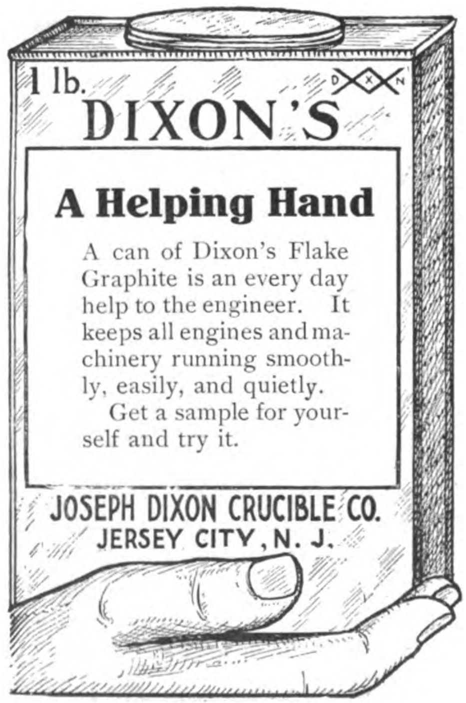
"There is so much to be learned that a long and industrious life leaves one with the feeling that he is but a beginner. The most important habit a young man can form is the "daily study habit." Let him put in even one hour a day to the reading of journals and books of reference in his particular line and much can be accomplished. He should keep an account of the time and if something interferes for a day he should charge himself up with it. A two weeks' vacation means fourteen hours to be made up. Most men can do more; no man has a right to do less, no matter how busy he may be.

"The leaders in any profession made a daily average of three or four times this amount of study the year round, in addition to the demands of an active career.

"The superintendent or manager must make frequent trips away for the purpose of observation. In no other way can he avoid the rut of self-satisfied content which checks advancement and limits usefulness. No amount of diligence in your own sphere or as a student can take the place of personal contact with men in your line of work."

A LONG-LIVED CRUCIBLE.

A long-lived crucible is on exhibition at the office of the Joseph Dixon Crucible Company, Jersey City, N. J. The crucible, which is a No. 70, was put through 81 heats at the plant of the Bristol Brass Company, Bristol, Conn., this breaking the company's record. The greatest number of heats recorded before was 78, at the plant of the Lumen Bearing Company, Buffalo N. Y. As in the long life of an individual, it is particularly good care as well as good make which makes the crucible last.—*The Metal Industry.*



Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Metal Workers' Crayons.

Dixon's Felt Erasive Rubber, for erasing pencil marks, typewriter work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite,

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Graphite for Type Setting Machines.

Dixon's Graphite for Talking Machines.

Dixon's Motor Chain Compound, for transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for leather belts.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Brushes, for motors, dynamos and generators.

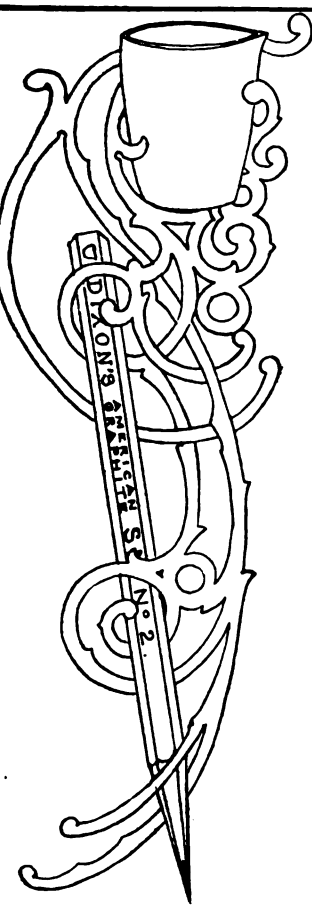
Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

Graphite.

VOL. VIII. OCTOBER, 1906. No. 10.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



TRAVELERS VS. CATALOGS.

It costs money to sell goods, and it matters not where, when or how you sell them. This is no sophistry. The old Emersonian theory of the house in the wilderness where the best rat trap and the best book were made, and the beaten pathway to the front door is not for this day nor this age.

Go into the center of a wilderness and the sheriff will be the only one to locate your establishment. You have got to come out in the open, advertise, expose your wares and take them nearby the people. It requires effort, and costly effort at that, to sell things nowadays.

Some of our friends consider the traveling salesmen, who distribute the goods from the jobber to the consumer, a needless expense. They think them handicaps, but they are as wrong as they ever were in their theorizing.

In a recent communication to a local publication up in North Dakota, "Farmer's Wife" upheld "cat" house methods because the travelers were expensive. She referred to one as a lily of the valley, and endeavored to convey the impression that he toiled not neither did he spin, yet he wore good clothes, stopped at the highest priced hotels, smoked the clear Havana in the leaf, and rode around from town to town in livery rigs. It is a rather pretty and inviting picture of a Son of Rest in mid-summer.

What of the midnight schedules, of the jerk-water trains, the tough food and rough fare—what of the cold and the heat and the burden of the day! If the traveler can face the music and still laugh merrily, he is entitled to his laugh. Good for him.

Think you that if the jobbers could sell just as many goods without the services of our friend, the traveler, that they would continue to pay him fat salaries? Yea, verily—NO.

If they took off their travelers their competitors would over-run their territory as the grasshoppers did Kansas a few years ago.

But the odds are always found in the difference. What are the odds in favor of the big retail mail order houses? Stop and think.

It costs Sears, Roebuck & Co. over $3,000,000, according to reports, to circulate their various catalogs. This big bulky book, the untidy, cheaply printed book, the book that we wish was moss covered and hung in the well. And this concern is a reaper, sowing nothing but catalogs and reaping nothing but cash, while you retailers have the right to put the accounts on the ice.

The traveler lives on country butter, eggs, potatoes—hires country rigs and distributes money wherever he goes.

Sears, Roebuck & Co. are like the locusts. They go over a state and the cash in the state hustles to the express office, post office or bank and demands a check for Chicago and you will never see it back again.

The traveler scatters a certain percentage of money that helps upbuild your country towns, your roads, and your villages.

The traveler is the friend of everybody—the retail mail order catalog the enemy of a town—the up-builder of the deserted village.

And an army of travelers, officered by high priced generals and riding in Pullmans night and day, would bring home a couple of millions anyway from the $3,000,000 appropriation.

The jobbers are not handicapped by the traveling salesmen. The genial traveler is an educator of the retail trade. He earns his right to pose before the catalog patrons as a lily of the valley, if he so desires, but while he is posing, unless the orders are coming, he will wish that he had started a mail order business eight years ago.

Hurrah for the traveler! —*The Hardware Trade.*

A BEAUTIFUL AND INSTRUCTIVE PUBLICATION.

The latest publication issued by the Joseph Dixon Crucible Company, Jersey City, N. J., is entitled "THROUGH 'FRISCO'S FURNACE," which is elaborately illustrated. The seven half-tone illustrations displayed therein are unquestionably the best views that have been shown of modern steel frame constructed buildings at San Francisco, that withstood the earthquakes and fire of April 18th, 1906.

"THROUGH 'FRISCO'S FURNACE" tells in an interesting manner of originality of the American Architect and Engineer, and of the soundness of their steel constructed buildings under the crucial test of earthquakes, dynamiting and fire. The purpose of the publication is to show how well Dixon's Silica-Graphite Paint preserves the maximum strength of steel work of high buildings, so that severe strains can be successfully resisted.

A free copy of the edition de luxe of "THROUGH 'FRISCO'S FURNACE," will be sent to any reader of GRAPHITE requesting this publication.

DIXON'S graphite publications sent free upon request.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

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JERSEY CITY, N. J., October, 1906.

EQUAL MONEY.

There is an eternal flow of public opinion as to what a rich man should do with his surplus money. The bulk of these views are unfriendly to the rich man. He is squinted at as a mean sort of a fellow for having surplus money and he ought to do something with it, and the what to do with it usually in these views takes the form of some vague, nebulous charity. The rich man, these vague views say, should bestow his surplus somewhere. Now, how? Ah! there's the rub.

Take you, the reader, and I, the writer; we don't want any of any man's charity money. This being so, who does want it? Then why not also give credit to the next man for being as high minded as you are, and as refusing the thought of charity money from any source the same as you and I.

Now, the laws of money getting are like all other laws. More or less imperative in operation, and as long as differences in money-earning talents exist, so long will one man have ten dollars and the next man one dollar. Why, then, is it not best for all hands, big and little, younger and older, who express views, vague and nebulous, as to the rich man's money, to try to get some of it the other way—by cultivating assiduously his money getting talents; this would equalize affairs. Maybe the outcome of a generation or two of this practice would bring it about that instead of one man having ten dollars and the next man only one dollar, that the system would yield to this lawful pressure and the scale would get to be first, one man nine dollars, and the other two dollars; then next, one man seven dollars and the other man three dollars, and the step then is easy to equal money.

—JOHN A. WALKER.

DANGER IN AIR COMPRESSORS.

The air cylinder of an air compressor should be lubricated with the best grade of mineral oil of light body and high flash test. It should not be of a coking nature, for if it is it carbonizes on the inside surfaces of the air heads and valves and not only prevents the valves from acting properly, but it frequently is the cause of accidents. The air cylinder requires but a small quantity of oil and after the machine has been running long enough for the cylinders to acquire smooth and polished surfaces, two or three drops per minute will be found a sufficient amount to keep the cylinder and its valves in satisfactory condition.

—*Practical Engineer.*

All who run air compressors, or own air compressors, or are in any way interested in them, should send for our new book on air compressor lubrication.

THE VALUE OF A CUSTOMER.

What's the cash value of a customer?

Of course they vary. Some are worth much good American money each year, some are less valuable, but all should have a market value to you, or you should cut out their trade. You are not in business for fun.

Every customer of the retail catalog house is an asset. They capitalize their assets.

When a customer pays his bills he becomes an asset. If he simply runs an account to be liquidated years afterwards he is a liability and his trade is not worth having.

The merchant can readily put a value on each customer. If he is of value, you should put forth more strenuous efforts to hold his trade. You should put yourself out to satisfy the demands that he may make upon your establishment and get the goods as speedily as possible. You should go out of your way to cater to this customer, without appearing to show favoritism. You should go to the limit with any customer whose trade is valuable.

And by the same measure, you should know the undesireable trade that it would be to your advantage to cut out. With this class of trade, make a quick shift. Make them pay for their goods, and if they are not willing, see that the goods are not taken away from your store.

Better pay attention to the customers who have a market value than to fool away your time with old liabilities.

—*The Hardware Trade.*

"THE MOTOR THAT MOTES."

"The motor that motes" day in and day out and gives satisfaction and full rated power, is the motor that is lubricated with Dixon's Motor Graphite.

This has been demonstrated and may be demonstrated by any man who has a motor.

ADJUSTING A CORLISS VALVE GEAR.

By W. H. Wakeman.

On going into an engine room a short time ago, where the engineer had been employed but a few days, consequently had not been able to adjust the engine and other machinery to his satisfaction, for lack of time, I found the Corliss engine running unsteadily, as it evidently needed adjusting.

The owners of this engine supply their engineer with an indicator and pantograph, consequently it took but a short time to secure a pair of diagrams which are illustrated in Fig. 1.

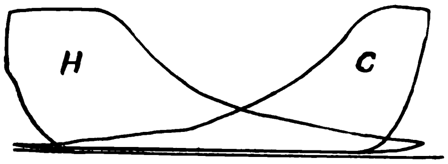


Fig. 1.

As the compression pressure was about ten pounds higher on the crank than on the head end, and it is always desirable to make it as nearly equal as possible, the first question to be decided was whether it should be raised on the head, or lowered on the crank end.

As the engine was not running as quietly as could be desired, it was unwise to reduce the compression pressure, therefore it was raised on the head end as follows:

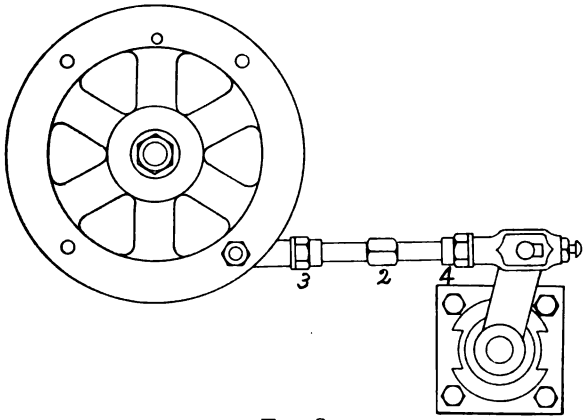


Fig. 2.

Fig. 2 illustrates the wrist plate and the connections joining it to the valve stem. The rod *2* is fitted with a right hand thread on one end, and a left hand on the other, therefore when the jam nuts *3* and *4* were loosened and the rod *2* unscrewed one revolution, it was lengthened twice the pitch of the threads. In other words, if these threads are cut eight to the inch, one revolution of the rod lengthens it a quarter of an inch.

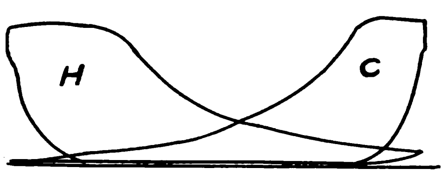


Fig. 3.

It was sufficient in this case to raise the compression pressure about five pounds. The engine was shut down again and the rod *2* given another revolution, which raised the compression pressure five pounds more, making it practically equal as shown in Fig. 3.

When making this adjustment on a Corliss engine, or any other with similar fixtures, care should be taken to avoid unscrewing these connections too far, for if only one or two threads are holding, when strain comes upon them they may strip and cause a wreck of the valve gear.

Attention was then given to another defect clearly shown in Fig. 3, as the point of cut-off is much longer on the head than on the crank end. The way to make this equal is shown in Fig. 4, as this valve gear is of the old style crab claw pattern.

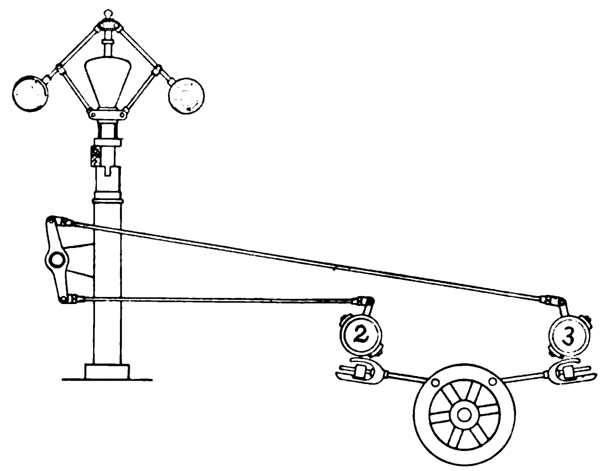


Fig. 4.

The first point to be decided was whether it was best to lengthen the crank end *2*, or shorten the head end *3*. The latter was deemed best, all else being equal, because lengthening the other might make it so long that steam enough to run the engine with a light load would be admitted with the governor in its highest position, therefore if the main belt should break while the engineer is absent, a fly wheel wreck would be the result.

The small reach rods connecting the governor and the tripping mechanism are fitted with a right hand thread at one end and left hand at the other, therefore the way to shorten the cut-off on the head end *3* is to shorten the longer reach rod. When an attempt was made to do this, it was discovered that it had already been shortened as much as possible until longer threads were cut on it.

As this was out of the question at this time, it became necessary to lengthen the cut-off on the crank end *2*, by shortening the reach rod for this end. Having done this by giving the rod one revolution, the diagrams shown in Fig. 5 were secured. They show improvement but were not considered satisfactory.

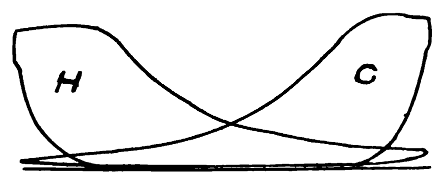


Fig. 5.

Engineers sometimes make a test of this kind by simply taking the diagrams without any special precaution, but such a test is worthless for the purpose intended, as nobody knows whether the load changed, or remained constant. To overcome this objection the governor was blocked, as shown in Fig. 4, and held rigidly while each diagram was taken. This

can be done in almost any plant, as it requires but a few seconds of time and a slight movement of the governor from its normal position.

The shorter reach rod in Fig. 4 was shortened another revolution, after which the diagrams shown in Fig. 6 were taken and the point of cut-off found equal.

When measuring the point of cut-off it is a good idea to place marks on both diagrams representing the place where the engineer estimates that the valves close, as it is not always clearly defined, therefore the desire to either prove them alike or different may influence the decision, but if these points are marked as shown in Fig. 6 there can be no mistake about it.

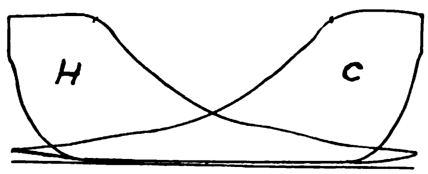


FIG 6.

If one leg of a pair of small dividers is placed at the top of the admission line, and the other where a previously located line crosses the expansion line, that gives the exact length of the point of cut-off for that diagram. This measurement is then transferred to the other diagram, where it at once gives an unprejudiced decision as to whether the points of cut-off agree or not, and there can be no doubt about the truth of it.

This plan was adopted here, and when the dividers were placed on the right hand diagram and then transferred to the left hand, they fitted nicely without being changed, therefore the cut-off mechanism was proved to be correctly adjusted.

If other diagrams are taken from this engine when running with a free governor, and each pair does agree as in Fig. 6, it shows that the load changed after the first was taken.

The above statement applies to this engine (or any other that has been carefully adjusted) so long as the point of cut-off is nearly or exactly the same as when adjustments were made. If the load is much lighter or heavier, giving a shorter or a longer point of cut-off than that for which the cut-off gear was adjusted, the diagrams will not agree. An explanation of why this is true belongs to another article.

HOT BEARINGS; THE CAUSE AND REMEDY.

One of the troubles in a power plant, according to the *Southern Engineer*, is the heating of bearings on engines and line shafting and oftentimes the cause cannot readily be found. Sometimes the cap nuts are not filled up evenly all around, with the result that one side of the cap cramps the shaft. This is a common occurrence, and if no attention is given it a serious accident may result.

When a hot bearing occurs there is always a reason for it. It may be that the shafting is out of line or is not level, or there may be a lack of oil. On some lines of shafting there are bearings on which the caps have a large opening and in which is placed some waste.

Before long the waste will fill up with dust, and when more oil is poured in the dust will be worked into the bearings. This invariably results in a hot bearing. Then the engineer or oiler wonders why the bearing runs hot after having run along smoothly for perhaps a long time.

Then again in some bearings grease is used in place of oil, and in some time dust will settle on the grease. When the latter becomes worked into the bearings, the dust will also get in and cause heating. The remedy is to cover the grease.

Change of temperature in an engine room may cause a hot bearing, for when a door or window is opened for a long time it will lower the temperature and cool the oil in the cups. Then they will feed slower or stop altogether. Were this to go unnoticed by the engineer a hot bearing will result.

When a bearing gets hot, shut down if possible, then wash out the bearing with kerosene oil and use graphite mixed with cylinder oil. In some cases the oil is at fault. It may not be adapted to the purpose for which it is used. It may be too light or too heavy. If the oil is too light then again the addition of flake graphite will help matters immensely and prevent heated bearings.—*Gas Power.*

DIXON'S Graphite makes the motor go. – *Joseph Dixon Crucible Company.*

The writer of the above sentence has conferred a boon on humanity. An up-to-date substitute for "Money makes the mare go" has long been needed.—*Profitable Advertising.*

WATER.

One of the Mightiest Elements in Nature. Some of the Wonders of Water Described by George G. Bennett.

Water has been the means of accomplishing more for civilization than coal was ever known to do, and was in existence several ages before a pound of coal was ever discovered.

Up to the present time, the entire range of possibilities of a pound of water have never been attained, and probably never will be entirely known; while, on the other hand, the possibilities of a pound of coal or carbon have been determined for many years. Water has never been mastered. Its composition requires the union of only two elements. It may be evaporated and blown away with the breath, and when unconfined, as a gas, knows no bounds or limits. The energy and possibilities of a pound of coal can be easily demonstrated, but who has ever demonstrated satisfactorily the amount of energy stored up in a pound of water under all the possible conditions in which it can exist? Experiments by De la Tour, French chemist, have been made with water up to a temperature of 773 degrees C., (1432° F) and as the boiler plates became nearly red hot, the experiment ceased. The same experiment was tried some years ago in England, with similar results; the exact pressure could not be obtained, as it was found necessary to discontinue the experiment, on account of the vessel not being able to withstand an increase in pressure.

If we could reduce a pound of steam at atmospheric pressure to water without the loss of heat, the heat stored within the pound of water would cause it to become red hot; and if it were possible to change this pound of condensed steam to a solid, like ice, without loss of heat, the solid would be white hot, or hotter than melted steel—it being assumed, of course, that the specific heat of the water and the ice remain normal, or the same as they respectively are at the freezing point. The same amount of heat that it takes to change one pound of water from 32 to steam at 212 degrees would convert one pound of iron into a liquid, and, as given by George H. Babcock in *Steam*, the heat absorbed by a pound of water to convert it into one pound of steam at atmospheric pressure would have been sufficient to melt three pounds of steel or thirteen pounds of gold.

With the exception of hydrogen, water has the greatest specific heat, or heat-absorbing capacity, of all substances, and is the unit of comparison employed for all measurements of capacities for heat. The specific gravity of water is taken as unity.

It furnishes, weight for weight, a much larger amount of vapor than any other known liquid. A cubic inch of water at its ordinary atmospheric boiling point expands to nearly a cubic foot of steam at 212 degrees, or about 1,590 cubic inches.

Water will boil at a less temperature than 212 degrees, if the pressure is reduced. In an absolute vacuum it will boil at 32 degrees, and at a pressure of 100 pounds (gage) it will not boil at a temperature below 337.6 degrees.

Converting one pound of water into steam at atmospheric pressure is equivalent to raising about 751,548 pounds to a height of one foot, and, if done in one minute, is equivalent to the energy that 22.77 horsepower is capable of developing.

To illustrate what water will do, we will call attention to the hydrostatic press, which is used whenever great power is to be transmitted through a small space. Two of these machines were used to raise the immense tubes of the Britannia bridge to their proper elevation. Such was the force employed to drive the water into the cylinders that it was required to raise the jet of water 20,000 feet high in a vacuum, which is equivalent to a pressure of about 9,000 pounds to the square inch. Just imagine for a moment a stream of water issuing from a nozzle under 9,000 pounds pressure, about 1,131 feet a second, or 67,860 feet a minute.

Think of this velocity; think of what water is capable of doing, that liquid that the poets delight to call "limpid," rushing along at a velocity of thirteen miles a minute, tearing up everything in its path; there is nothing that is able to withstand this terrific force. It would be sufficient to bore a hole through a plank at a distance of 1,000 feet; a mountain would fade away before this stream like snow before a summer's sun. Turn this stream on one of our largest buildings and it would vanish from sight in the twinkling of an eye; it would rip up our pavements as if they were sand dunes; it would roll rocks the size of our largest lake steamers before it just as easily as a small boy rolls a marble along the paved street. It is one of the mightiest elements in nature.

In California a single jet of water six inches in diameter is issuing from a nozzle at the rate of 20,000 feet a minute, or a pressure of about 650 pounds a square inch; and in Colorado, a turbine is operated under a head of 2,000 feet, or a pressure of 866 pounds a square inch. The efficiency of the water turbine is about 85 per cent.—no loss here of 83 per cent. as with the "pound of coal."

This subject might be carried to an indefinite length and still be interesting, but we think the above facts will be sufficient to prove our point, that water is "king," always has been "king," and will ever remain "king" as long as water exists on this mundane sphere.

Extracts from paper read before the Ohio Society Mechanical, Electrical and Steam Engineers, May 18-19, Pittsburg, Pa., and printed in *Engineer's Review*.

A Diamond burning in the electric arc was lately exhibited on a screen by Sir William Crookes. The stone could be seen to sprout and swell and blacken under the intense heat until nothing remained but a swollen lump of graphite.

—*American Cultivator*.

AUTOMOBILE ACCIDENTS.

Due to "Bowed" or "Seized" Steering Devices, Which May Be Prevented by the Use of Dixon's Flake Graphite.

The Horseless Age, in an editorial on "Causes of Steering Gear Failures," says: "Lack of lubrication of some part of the steering mechanism may conceivably cause it to stick. Instances are not uncommon of steering devices which move with great difficulty, on account of lack of oil or undue tightness at some point. Such gears may be all right under ordinary conditions, but they are likely to gradually or suddenly become more tight, and in a sudden emergency, when one hand of the operator is otherwise engaged, may not respond quickly enough to avert an accident. A peculiarity of accidents caused by defective steering gears is that the operator generally does not realize the seat of the difficulty until too late, and makes frantic and futile efforts with the wheel, rather than applying the brakes. Such complete dependence is habitually put upon the steering gear that a precious second is required to apprize the mind of the operator that it is at last inoperative. This second's delay too often proves disastrous.

"Frequent inspections of steering gears, copious lubrication and intolerance of any undue looseness of parts, upon the one hand, and of any tendency toward binding upon the other, are the most effective safeguards against accidents of this kind. Manufacturers should so design their steering devices as to minimize the danger of anything preventing the free action of the moving parts, and should provide for easy and effective lubrication of all parts concerned. No part of a car is more worthy of frequent and careful examination than is the steering gear, but it is a sad fact that hardly any portion of the equipment is more generally neglected."

In Dixon's Flake Graphite we have the wonderfully thin and marvelously smooth Ticonderoga graphite, a graphite that is unequalled for thinness and smoothness, and which will adhere so strongly to metal surfaces that it is practically impossible to wipe it off.

Professor Goss demonstrated that the only way they could be displaced was by grinding them off.

Where Dixon's Graphite Lubricants are used on bearings, the surfaces become covered with a veneer-like coating of flake graphite that will not permit "binding" or "seizing" of parts. With oil or grease alone "binding" or "seizing" is liable to happen at any time, as oils and greases are ever ready to run from the surfaces and a new supply is constantly called for. It is not so with Dixon's Flake Graphite, which never runs off but clings tightly and wears off slowly.

Bad bearings are liable to breakage because of jamming of balls. If Dixon's Graphitoleo is used the liability of jamming is probably entirely eliminated as the balls become covered with the graphite.

All who are interested in lubrication should remember this: that all surfaces, no matter how carefully ground or machined, are full of microscopic irregularities. It is these irregularities that "bind" or "seize" when heated by friction and wear. It is the thin flakes of graphite that build up these irregular surfaces and form a graphite to graphite bearing instead of a metal to metal bearing. That is all there is to graphite lubrication, but it should be remembered that it is *thin, flake* graphite that should be used. Amorphous and ordinary graphite will not answer.

SHORT KINGS.

The Phrenological Journal tells us: There is hardly a king in Christendom whose wife does not overtop him by a head.

The English king is quite six inches shorter than Queen Alexandra.

The czar, a little man, is overtopped a full head by the czarina.

Kaiser Wilhelm is of the medium height, but the German empress is tall, and that is why the proud Kaiser will never consent to be photographed beside his wife unless she sits while he stands.

The king of Italy, short and squat, hardly comes up to the shoulders of the tall, athletic Queen Helena.

The king of Portugal, though fatter, is less tall than his queen.

Even the prince of Wales is shorter a good four inches than the princess.

And the young king of Spain is several inches shorter than his youthful queen.

DENATURIZED ALCOHOL.

Its Advantages and Its Disadvantages.

By L. H. SNYDER, M. E.

We have heard a great deal about the advantages to be gained by the use of alcohol as a fuel in internal combustion motors, and perhaps it will not be out of place to mention a few of the difficulties that have to be overcome.

First disadvantage is a large quantity of air will have to be used to prevent the formation of rust in the valves and the cylinders, and it is not unlikely that the alcohol will have to be diluted by the addition of benzine or similar material, some authorities being of the opinion that at least 40% of the mixture will be something other than pure alcohol.

Secondly, alcohol is hard to vaporize compared with gasoline, and it will be necessary to have some auxiliary for starting, which will be doubly hard in the winter to start on alcohol alone. This will make the motor complicated.

One advantage claimed is that a higher compression can be obtained, and in this way an engine of smaller dimensions will give greater power, but to do this it will be necessary to strengthen the general design.

A second advantage is that in case of fire alcohol can be easily extinguished with water which is not possible with gasoline. When gasoline is afire sand is more useful than water.

A great demand for the denaturized alcohol will be in the general arts, where at present wood alcohol has to be used. Wood alcohol is unhealthy to work with, and as good results cannot be obtained as when grain alcohol is used.

So it can be readily seen that it is going to be some little time before any great changes will take place in the combustion motors due to the introduction of alcohol.

THE MINDS OF THE PEOPLE.

We read in *Little Journeys* that George Washington said: "Without the pamphlets of Thomas Paine the hearts and minds of the people would never have been prepared to respond to our call for troops."

And that "no one disputes now but that it was a book written by a woman that prepared the way for Lincoln's call for volunteers."

That "Literature and oratory are arsenals that supply the people their armament of reasons. Thinkers prepare the way for thinkers."

It has been the Dixon Company, and the Dixon Company alone that, by its pamphlets and publications and the oratory of its salesmen, has prepared the minds of the people to understand the value of Dixon's Ticonderoga Flake Graphite as a lubricant.

It has been the Dixon Company and it has been the Dixon Company alone, that has brought out and paid for the best practical skill and the best professional talent to determine beyond question the relative values of amorphous, crystaline, foliated and the thin, Ticonderoga flake graphite.

Handling all varities, as it does, the Dixon Company has been in position to be absolutely impartial.

The result has been that Ticonderoga thin flake graphite has proven superior to all other varieties.

DIFFERENT CRUCIBLE MIXTURES.

"We were formerly of the opinion," says *The Brass World*, "that one crucible mixture would answer for all purposes and that the crucible manufacturers used different designations for their crucible mixtures for selling purposes alone. We have long since abandoned this idea and now firmly believe that a crucible should be adapted for the metal it is to melt.

"It is a well known fact that a crucible which will give good results in steel melting is not suitable at all for brass metal and vice-versa. Again, a crucible which is suitable for melting nickel anodes is unsuited for melting aluminum. All kinds of metal may be melted in any mixture of graphite crucible, as the graphite is sufficiently refractory to withstand any ordinary furnace heat, but if the maximum number of heats are desired on a crucible, then attention must be paid to the mixture.

"Let us take, for an example, a crucible that is to melt aluminum. The mixture need not be a particularly refractory one, but it must be of such a nature that it will not scale or disintegrate. The life of such a crucible will then be long. If a crucible is to be used for making nickel anodes, then the mixture must be very refractory and capable of resisting the fierce heat that is required to melt the nickel without cracking. Then, too, the clays should be selected so that fluxes will not act upon them rapidly.

"It may seem ridiculous to many foundrymen to make these statements, but we know that far better results have been obtained by adapting the crucible to the metal that is to be melted. This is within the possibilities of crucible manufacture and is now being done. It will not be a matter of regret to the founder if he allows the crucible manufacturer to make a crucible for him that is adapted for his work. The cost will be no greater and the results will warrant it."

It has always been, and still is, the policy of the Dixon Crucible Company to aid the metal founder in every way possible in the selection of the proper crucible for the work intended. The Dixon Company were probably the very first to make different crucible mixtures for different work.

In other ways the Joseph Dixon Crucible Company has endeavored to assist the founder to a better understanding of the proper use and treatment of plumbago crucibles—how they should be treated before placing in the fire, when they are in the fire and when they are removed from the fire. Also in respect to the different fires—oil, coke or coal.

USE OF GRAPHITE AS A LUBRICANT.

There are few problems of more importance to the motor car manufacturer and the motor car user than that relating to lubrication. The use of graphite has often been suggested as being the most advisable. In a recent number of the *Automotor Journal*, the well known British automobile weekly, an interesting article on graphite as a lubricant is published. The article reads as follows:

Graphite as a lubricant unquestionably serves a distinctly useful purpose on motor cars, the more so perhaps because it has such very clearly defined properties of its own. For one thing it is a solid mineral substance, and for another thing it is, to all intents and purposes, unaffected by heat. From the first point of view it is therefore invaluable in cases where oil or grease cannot be retained between the friction surfaces, and from the other point of view it is obviously a most useful substitute for any other kind of lubricant when the moving parts are liable to be subjected to a fairly high temperature. Driving chains are essentially one example in which graphite can be employed with marked success. The motion between the links and the pins of a chain is oscillatory and takes place under considerable pressure. With such to-and-fro motion there is a distinct tendency for any sort of oil to be squeezed out from between the contact surfaces, with the ultimate result that lubrication becomes inefficient. With rotary motion, this squeezing out of the oil is counteracted by the fact that every part of the circumference of the shaft is brought into full play during each revolution, thus causing fresh oil to be wiped into position to make up for that which is squeezed out, and insuring the presence of a perpetual film of oil between the surfaces. By using graphite the dangers of a dry surface are neutralized, for the graphite enters the pores of the material and forms a more or less permanent skin of a highly anti-friction character. It is essential, of course, to get the surfaces properly impregnated, and in the case of a chain, for instance, where local application to each pin is impossible, the best method is to immerse it in a hot graphite bath—for which a special compound containing a large proportion of graphite is procurable—so that the mixture may have time to find its way into every crevice where the graphite will deposit, and form a suitable coating.

The rocking-spindles that form such an important part of nearly all low-tension igniters, are another marked example of a class of mechanism in which graphite is a distinct advantage, for, in this case, this solid lubricant not only suits the to-and-fro motion of the moving part, but it also retains its full properties, in spite of the fact that igniter-spindles are usually fairly hot when in use.

For certain other purposes a mixture of graphite and grease is prepared by the makers for use in grease cups and gear-boxes.—*The Motor Way.*

THE VALUE OF COMRADESHIP.

Man as we know him to-day has been made by other men. Through their friction, their friendliness, their comradeship. Can we imagine a man born into a country in which there were no other men—a man with never an opponent to stimulate him, a crowd to applaud or a friend to flatter? Could a man become a man without the help of other men—without comradeship? The answer is plain. He could not. Each man is, to a great degree, formed by the influence of other men. Man has three creators—his God, himself and his fellow men. God gives to man his body and his mind; man and his fellows working together mould body and mind into form and character.

In the development of man's individual nature the strongest factor is comradeship—the influence of his fellows. Proper comradeship makes him healthy, active, intellectual, refined, dominating. Negative comradeship makes him sickly, indolent, stupid, brutish, vacillating. Few, even among the thoughtful class, realize the stupendous influence of comradeship in forming character, in forming men. We are firmly convinced that by intelligent co-operation and inspiring comradeship the men and women in the world today could produce a race of superior beings, and we firmly believe that some day it will be done.

But, meantime, until the world shall awaken to its privilege there is no reason why this stupendous power of comradeship should not be utilized by individuals toward their own development, bodily, mental and spiritual.

A stupendous power is comradeship either to uplift or to depress, to develope or to destroy. And the more sensitive and refined the person, the more easily is he or she influenced either for good or evil. One of the most important matters in life is the choice of one's companions, the influence by which one is surrounded. They are the food of his mind; and his mind determines the bodily condition. One may so choose his companions as to make daily gain in health, energy, beauty and intellect—as to convert himself, herself, from weakness, dullness, ugliness and ignorance into strength, brilliancy, beauty and wisdom. Our choice of companions makes us—or unmakes us.—*Health-Culture.*

A PENCIL WANTED.

Invention quotes the following from a contemporary: "It is good news to hear that the custom of writing letters in pencil is likely to become popular. When it is once established we shall probably never return to pen and ink save for legal documents and business papers. The reason for the adoption of pencil for ordinary communications is not difficult to understand. Nobody has time to indite the lengthy epistles that used to be so acceptable to our ancestors, and if anyone could be found with sufficient leisure to pen these elaborate caligraphic exercises no one would be disengaged enough to read them; and few people in the present day keep the brief notes that they exchange simply because they are not worth keeping. Why, then, should we trouble ourselves with all the misery that may be involved in pen and ink? A pencil is not only much cleaner and more portable and more generally convenient than a pen; it is much easier to use, and, therefore infinitely less tiring. You can write with a pencil at any time and in any place. I often find myself shuddering at the idea of pen and ink, when I can go gliding over the paper with a pencil with the greatest pleasure. It seems we are altogether changing the order of things. Now the pen has become the principal implement of the draughtsman, it seems probable that the pencil will achieve high favor amid scribes. We, however, require a pencil of somewhat blacker character than those of ordinary lead. This we shall doubtless have in time, and when this is acquired we shall probably care very little about pen and ink for our casual correspondence.—*Exchange.*

A CONVENIENT RULE FOR INTEREST.

Multiply the principal by as many hundreds as there are days, and for

4% divide by	90	8% divide by	45
5% "	72	9% "	40
6% "	60	10% "	36
7% "	52	12% "	30

EXAMPLE.

Interest on \$144.00 for 169 days at 5%; 144 × 1.69= 243.36, which divided by 72=\$3.38, the required interest.—*American Home Journal.*

THE LOCOMOTIVE.

They call me a mass of iron and brass;
  They say that a spirit I lack;
That my real soul is the grimy man
  In the wooden pen on my back;
That the flame I devour and the steam in my veins
  Are the creatures of man alone,
And I have no mind but the mind of men,
  Those beings of flesh and bone.

Let them say if they will, and whatever they will,
  Though had they but noted me when
I was scurrying over the iron rails,
  The wonder and pride of men—
Had they watched as they might, they had seen a will
  As I sped on my iron path,
And a purpose of terror when once I awoke
  And aroused to a terrible wrath.

I have borne their yoke in a patient way
  For many a weary hour—
The pity that filled my massive breast
  Forbade me to use my power;
But I am not always a passive thing,
  Nor forever with joy I scream
As I rumble and clatter and scurry along,
  With my nostrils breathing steam.

For when they are proudest to think me theirs
  My patience a moment fails,
And then, with a thousand wretches behind,
  I leap from the guiding rails;
Over the lofty embankment I slide
  And plunge to the depths below,
While the careless laugh of the people I dray
  Is changed to shrieks of woe.

And so tonight, in the midnight deep,
  With my glaring eye I peer
Through the darkness that covers the path before,
  And I startle the engineer;
For I whirl from side to side,
  And I pant and struggle and scream with delight;
Reverse! down brakes! there's a tree on the track,
  And death rides abroad tonight!

Some are asleep in their seats, and dream;
  And others, in accents gay,
Are telling light stories of what they have seen,
  Or discussing the news of the day;
And some are thinking of things long past;
  And others again there be
Who are longing to meet their children and wives
  In the homes they never may see.

A jar and a crash! I scream as I leap,
  And I feel my stout ribs bend;
While the cars they crash like houses of card,
  And their strong beams splinter and rend;
And here is a head, and there a limb,
  And mark, when the lights are brought,
The quivering flesh that once was a shape,
  And walked and talked and thought!

You say that I am an inanimate thing;
  That I neither can know nor feel;
That merely steam through an iron rod
  Is moving my driving-wheel!
Why, I planned this thing, and brooded alone,
  And thought of it day by day,
And waited my chance, and bided my time,
  As I sped on my tiresome way.

You builded a monster of iron and brass,
  And you fed it with water and flame,
And you thought it a creature your finger-touch,
  Whenever you would, could tame;
Had you known its temper, or studied its ways,
  You never had felt its might,
And the mangled dead on the cold earth spread
  Were living and merry tonight.

—*Harper's Weekly.*

GRAPHITE FOR THE JOINTS OF FOLDING CHAIRS.

During the first meeting of the Master Car Builders' Association, the folding chairs in the convention hall used by the members were noisy. Some thoughtful man got a package of Dixon's Graphite Lubricant and lubricated the joints of all the chairs and the trouble was over.

—The *Daily Railway Age*, June 19, 1906.

This is not the first time the Dixon Flake Graphite has smoothed away the troubles of the railroad man.

ENGINE ROOM TROUBLES AND CURES.

Quite often dash pots on Corliss engines are noisy and troublesome and the following method for removing the difficulty was mentioned by Mr. L. Collman in *The Engineer*, August 15, 1906. The writer also tells how he feeds graphite and grease.

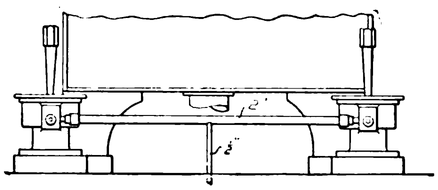


FIG. 1. CONNECTION BETWEEN THE DASHPOTS.

I have charge of a 75-horsepower Corliss engine and a 90-horsepower boiler. I shall try to explain how I got rid of a pair of noisy and troublesome dashpots. The method is simple and can be applied while running. By connecting the dashpots, as shown in Fig. 1, they work easier, make scarcely any noise and require less oil and attention.

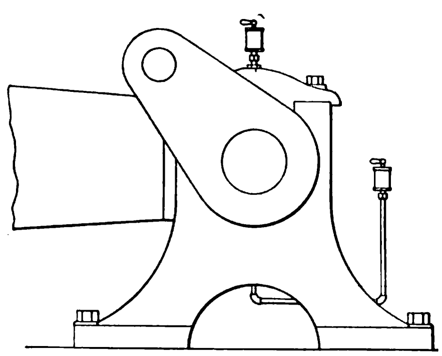


FIG. 2. GREASE CUP CONNECTION WITH THE MAIN BEARING.

Figure 2 shows another device I put on for feeding grease and graphite to the main bearing. The hole through which the pipe passes to the bottom block is larger than the ⅜-inch pipe in order to allow for the adjustment of the bearings. I think all large bearings should be equipped with both oil and grease cups. The owners told me that this bearing had always run warm, and it served me the same until I put the grease cup on. The result was well worth the trouble, for it has run cool since and gives no trouble.

FRANKLIN ON THE EAGLE.

Benjamin Franklin's contumelious characterization of the eagle is contained in Audubon's Ornithological Biography, and reads as follows:

"For my part," says he, in one of his letters, "I wish the Bald Eagle had not been chosen as the representative of our country. He is a bird of bad moral character; he does not get his living honestly; you may have seen him perched on some dead tree, where, too lazy to fish for himself, he watches the labors of the Fishing Hawk; and when that diligent bird has at length taken a fish, and is bearing it to his nest for the support of his mate and young ones, the Bald Eagle pursues him and takes it from him. With all this injustice, he is never in good case, but like those among men who live by sharping and robbing, he is generally poor, and often very lousy. Besides, he is a rank coward; the little King Bird, not bigger than a Sparrow, attacks him boldly, and drives him out of the district. He is, therefore, by no means a proper emblem for the brave and honest Cincinnati of America, who have driven all the *King Birds* from our country; though exactly fit for that order of knights which the French call *Chevaliers d'Industrie*."—*Forest and Stream.*

WE have received copy today of volume I., issue No. 1, of *Equipment News*, printed in Denver, Colorado, under date of July and August. This is printed every other month, by the Publicity Department of Hendrie & Bolthoff Mfg. and Supply Co., Denver, Colo. It is a nicely printed paper giving, on page 13, cuts of the offices and salesrooms of the Hendrie & Bolthoff Mfg. and Supply Co., and on pages 14 and 15, copies of their various rooms in their large building, and the other pages are made up of valuable information of all kinds of mining and mill supplies. Hendrie & Bolthoff is one of the largest firms west of Chicago, and they are authorities on all kinds of milling and mining machinery. We wish them good luck with their new publication.—JOHN A. WALKER.

"SMOKE GRAPHITE."

We are asked to tell what "smoke graphite" is. To show that there is such graphite we are sent a circular advertising a chain lubricant which "is made from smoke graphite."

To venture a guess we should say that the manufacturer uses lampblack, which is deposited from smoke.

If this is so then our readers will please bear in mind that lampblack or "smoke graphite," is not a lubricant in any sense of the word. Dixon's Flake Graphite has attained such an enviable reputation as an unexcelled lubricant that there are many would-be rivals to Dixon's Graphite Lubricants.

None causes us to worry, some of them make us smile.

COPPER CASTINGS.

Pure copper cannot be cast in sand without considerable difficulty; in fact, some deoxidiser is always used. For common copper castings from 2% to 5% zinc is generally added to get sound castings; but for electrical work this is useless. *The only way to get good electrical castings is to melt pure electrolytic copper in a plumbago crucible under a thick layer of charcoal.* When thoroughly melted add 2% silicon copper and stir it in with a stick and cast as soon as ready. Practical experience alone will show the correct temperature for casting copper in sand moulds, and the proper temper of the sand. It must not be cast boiling, but a fairly high temperature is necessary.—*Metal Industry.*

THE chief engineer of one of the Government vessels, but whose name and vessel we are not permitted to make public, writes us as follows: "I have been using Dixon's Flake Graphite as a cylinder lubricant for the last ten months and the value of this flake graphite as a lubricant is far above my expectations.

"I have been feeding this graphite through a Lunkenheimer Graphite Lubricator on the main engine, which is run under two hundred fifty pounds steam, and I have also been using the graphite in our air and circulating pump which is run under ninety pounds of steam.

"Upon examination of the cylinders I find them like a looking glass, and the pump works 50% better and steadier than when using cylinder oil."

THE MERCIFUL MAN.

"A merciful man is merciful to his beast," is a wise saying whether that "beast" be a real one or a mechanical one.

The man who has a fine engine or any fine piece of machinery is a wicked man if he does not see that that machine is well cared for. Especially that all parts that move one upon another are well lubricated and thereby saved from undue friction and wear.

There is many an engineer in the country who so loves his engine that he does not hesitate to buy with his own hard earned money a can of Dixon's Flake Graphite if his employers fail to furnish it, that his engine may have the best possible treatment.

REMOVING BOILER SCALE.

By Means of Flake Graphite.

We find the following in *The Threshermen's Review:*

Editor Review:—I like your paper fine, and while looking ver the questions and answers I saw the question asked: What is the best thing to take scale off a boiler? I have found out that flake graphite is the best thing to use. I found this out by accident. I thought by putting flake graphite in my tank pump it would work much better. I placed the graphite in tank pump, which lubricates tank pump valves and crosshead pump valves and cut scale from boiler.

O. V. FOSTER,
New Middletown, Indiana.

Mr. Foster's experience is similar to that of others whom we know whose letters have appeared in GRAPHITE. We ourselves have made use of Dixon's Flake Graphite and kerosene oil with marked benefit.

CURE FOR FRICTIONAL LOSSES IN TRANSMISSION CHAINS.

Mr. George de Prule, Chief Engineer to the London Road Car Company, says, "Nothing annoys the public more, or adds more to the frictional losses, than dry and worn chains. Every road car chain is taken off its chain-wheel, cleaned, boiled in a suitable lubricant, (Dixon's Motor Chain Compound) and replaced every night."

TO FIND THE SPEED OF TRAINS.

When traveling on a through train a passenger with time-table in hand can easily tell the rate at which his train is traveling.

Let him take the time from one station to another and multiply the number of miles by sixty and divide this by the minutes used.

This may be very easily and quickly done and will give the miles per hour. For instance, from A to B is six miles and the time seven minutes; $6 \times 60 = 3600 \div 7 = 51.42$ miles per hour.

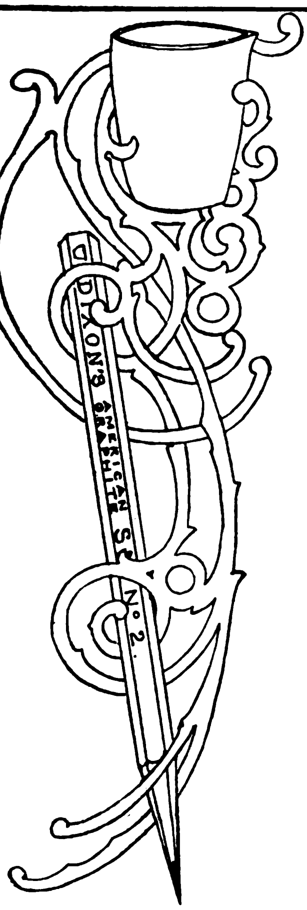
THERE comes to our editorial table the August number of *Hardware Journal* of San Francisco, a very sightly little paper, which is running its 5th volume. It is full of Pacific Coast news, hardware advertisements, market quotations, etc., and we should think it a valuable paper for all the hardware dealers on the Pacific Coast to subscribe for.

—JOHN A. WALKER.

Graphite.

VOL. VIII. NOVEMBER, 1906. No. 11.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



CHANGES THAT COME.

Every manufacturer notes from time to time the radical changes that come about. Sometimes changes come because of fashion; possibly they come now and then simply because people want a change; more frequently, perhaps, they come because people find that their old idea of a thing was wrong and they see the need of a change.

Twenty or twenty-five years ago the educators of the country considered that the standard size of a pencil was too large for the small hands of children, and the pencil manufacturer was pressed to make a pencil of small diameter. This was done and the educators considered it a great improvement and a great benefit to the children.

It has now come about that the educators have found that instead of a pencil smaller in diameter the children really require a pencil greater in diameter than the ordinary pencil used by the adult.

The greater diameter of the wood is found to be a distinct advantage from the standpoint of fatigue, and therefore the pencil manufacturers are now producing for the small children a pencil of a diameter that would have been considered absolutely ridiculous and harmful a quarter of a century ago. The lead of the pencil has also been increased in diameter for what have been considered good reasons. It is now further thought that the pencil should not be varnished and finished except possibly for hygienic and artistic reasons. It is considered more difficult for young fingers to manage a pencil with smooth, fine finish than one where the surface is rough, so that it doesn't slip so easily. It seems to be somewhat a question whether the advantages of a rough surface counterbalance the disadvantages, but certain it is that the pencil of large diameter is meeting with the great approval of school officers generally.

AMORPHOUS VS. FLAKE GRAPHITE.

A prominent manufacturer of automobiles has lately fallen victim to the idea that has possessed so many good men—the idea that because a very finely pulverized amorphous graphite is so smooth and so slick and rubs out so nice on the palm of one's hand, and generally appears to be so attractive, that it will prove a better lubricant than thin flake graphite for bearings or machines and especially for engine cylinders, whether those cylinders are steam cylinders or are the cylinders of internal combustion engines, such as automobile engines, gas engines, etc.

This same manufacturer has, in our opinion, been unwise in giving the following very large publicity:

"We have found a graphite that can be mixed with cylinder oil and practically held in suspension there, so that we are enabled by well mixing the graphite with the oil beforehand to use it in our lubricators. This has been found to add considerable to the lubricating efficiency of the oil. We recommend that this graphite to the amount of one teaspoonful be mixed with every pint of lubricating oil for the engine. It will be found that with this mixture the operator will be able to get the same lubricating effect with less oil."

We have omitted mention of the brand of graphite recommended, but it is one of the best brands that we know of in the way of amorphous graphite.

The world is wide and there is no reason for one manufacturer knocking the product of another manufacturer, and nothing is further from our minds than to do more than educate people to the nature of graphite.

In the first place, the specific gravity of all kinds of graphite is much more than that of any oil. Nature made it so and we cannot change the fact, therefore with the same certainty that water itself will settle to the bottom of oil so will graphite of all kinds settle. There have been thousands of dollars spent in the endeavor to make a graphite lubricant where the graphite is held in suspension in the oil, and every attempt has been a failure.

The automobile user who mixes graphite of any kind with the oil and uses it in his lubricator as recommended above is liable to have trouble.

If such a mixture is made as recommended above, a teaspoonful of graphite to the pint of oil, and if that mixture is used up at once there will be no particular trouble except that which comes from the use of amorphous graphite. Amorphous graphite contains quite a large percentage of clay, and as clay is one of the best binders known, the clay and the amorphous graphite and oil will form paste balls in the cylinder and cause, finally, an endless amount of trouble.

If the user of an automobile makes up such a mixture, fills his lubricator with it and doesn't use it entirely on one trip and allows his machine to stand idle for a few days, or a week at the furthest, he may be certain that the graphite will settle and in all probability stop up the feed tubes, then he will have trouble indeed.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

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JERSEY CITY, N. J., November, 1906.

ANNUAL CONVENTION OF THE N. A. S. E.

The Joseph Dixon Crucible Company was represented at the National Convention of Stationary Engineers, held in Philadelphia in September. The young men who acted as representatives of the Dixon Company at this convention reported a dignified and large attendance of men that seemed to be the picked representatives of the engineers throughout the country. Altogether there were about seven hundred delegates and then a good many others who came along, paying their own expenses, showing the interest that the engineers generally have in their annual convention and their desire to learn what is new in their profession and what is worth their seeing and worth their studying.

The next convention will be held at Niagara Falls.

THANK YOU,—AWFULLY.

Thank you for the October issue of GRAPHITE. It is the best number I have seen yet in matter and manner, in all respects most admirable. Brilliant as a Dixon crayon, fine and clear as the mark of a Dixon pencil, and smooth as graphite, it delights without fatigue and instructs without friction.

In an attempt to get even I am sending you a copy of the current issue of *Municipal Engineering*.—GOODWIN LEE.

USE OF GRAPHITE.

Some Kindly Words from the Catalogue of an Oil Manufacturer.

Our thanks are due to the Waverly Oil Works of Pittsburg, Pa., for the following concerning graphite:

"The action of graphite on rubbing surfaces is somewhat generally misunderstood. It is not a 'lubricant,' but may more properly be termed a 'filler.' It enters every crack and pit in the surface and fills and overlays them until a new surface of more regular outline is produced. While we use no graphite in our oils we advocate its use—not regularly from day to day—but simply in preparing new bearings or in restoring old bearings for proper oil lubrication.

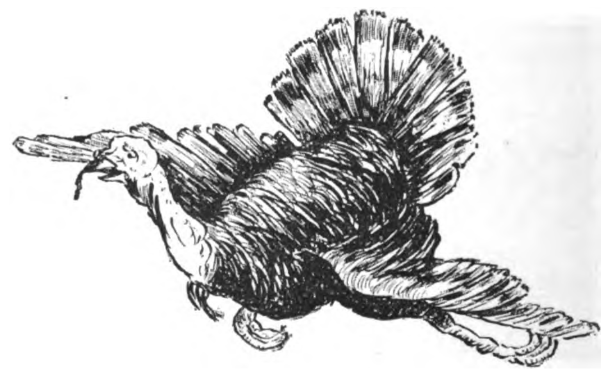
"Properly adjusted and smooth surfaced bearings require very little oil, which must be thin and free flowing in order to get between the close fitted surfaces, but at the same time must be of highest viscosity.

"It is a common error for a thick, heavy appearing oil to be considered a better lubricant than a thin, fluid oil, but when one remembers that sperm oil (but little thicker than water) is the best lubricant known, the error at once becomes apparent.

"When a thick, heavy oil is necessary to run a machine it is positive proof that the bearings are rough or not properly adjusted, and in such cases graphite is almost indispensable, as it is far more economical to smooth up the bearing with graphite than to use the necessarily large quantity of heavy oil to keep them running cool."

It should be observed, however, that there is graphite and graphite. Our good friends, the Waverly Oil Works, would have put it stronger for the Dixon Company and stronger for the oil companies and all oil users if they had been particular to say that Ticonderoga Flake Graphite should be used, and they are greatly in error in saying that graphite is not a lubricant. It is the best solid lubricant known to practice or science, and is classed under the head of lubricant by every dictionary and book of authority on lubricants.

THE DINNER BIRD—DON'T MISS HIM.



Here's to you! a bountiful board, good appetite, and all your folks at home to enjoy it with you.

December GRAPHITE will have an article by W. H. Wakeman on "The Steam Loop in Theory and Practice." Copy did not reach us in time for November issue.

Mr. Wakeman's object in writing on this subject is to assist men in charge of steam machinery to understand the apparatus that they control, as it is well known that men can be found in charge of such machinery who know little or nothing of the principles which govern its operation.

FRICTION-REDUCING MATERIALS AND APPLIANCES.

The "Axiom" system of dynamic grease lubrication is shown by Messrs. Thompson Bros., of 155 Fenchurch street, and has several features worth studying. Users of power of all kinds will also be interested in the exhibit of the Joseph Dixon Crucible Company, of 26 Victoria street, S. W., where they show a number of their graphite productions. Flake graphite is of special value for lubricating cylinders and valves rendered difficult of lubrication owing to the high pressures and the use of superheated steam in modern practice. There are many difficulties to be overcome in the proper application of graphite for internal lubrication of steam engines. The Dixon Company show on their stand two of the Chapman graphite lubricators, manufactured by Messrs. Knowles and Wollaston, which are in use on a very large number of engines throughout the country, feeding graphite and oil, and in some cases a new patent oilless lubricant recently introduced by the makers of the lubricator. Graphite is quite unaffected by the high temperatures now obtaining, and its high lubricating qualities are nowhere more apparent than in the cylinders and valves of modern high-class steam engines.—*Standard*, London.

LUBRICATION OF DISC CLUTCHES.

Many users of multiple disc clutches, says *The Motor World*, obtain good results from lubricating them with a mixture of soft-soap and water. The cooling effect of the water is better than that of oil alone and the lubrication is sufficient for the purpose. What is still more to the point, the mixture being less viscous than oil alone, the films between the plates are readily squeezed out when starting, thus allowing of more rapid acceleration. Similarly, as there is absolutely no tendency to gum, there can be nothing to interfere with an immediate release when declutching is attempted.

We wonder if some of Dixon's Motor Graphite, either in oil or in the soft-soap and water, would not be a good thing.

PICK THE WINNER.

When Booth Tarkington was at Princeton University the editor of the college paper was a young fellow who took himself and his literary responsibilities with portentous seriousness. He was wont to speak in accents of emphatic scorn of the quality of the submitted contributions from which he was supposed to make a periodical worthy of the senior class. One day he found in his letter box a poem which moved him to more than usual disgust. "See here," he snorted contemptuously, "this is what some fool freshman sends in and calls poetry. How am I going to make a magazine out of stuff like this? How am I, I ask?" "Oh, that!" spoke up Tarkington, "yes, I sent that in myself." "So you wrote it, did you?" growled the managing editor. "No," said Tarkington sweetly, "I didn't write it. I only copied it. It was written by Tennyson."—*The Progressive Printer*.

THE MULE AND THE HEN.

Great as is the mineral wealth of Missouri, it was the mule and the hen, says Elbert Hubbard, that paid off the mortgages and gave Missouri her balance in the bank.

BENJAMIN FRANKLIN'S BRAINS.

Note the following clipping from *Science*:

This paper collects together some published and unpublished items illustrative of the great variety of work that Benjamin Franklin did bearing on meteorology, closing with his study of the cold winter of 1783–4 in Europe, and the prediction (which was perfectly well verified) of the cold winter of 1786–7 in Pennsylvania and New England. This last effort, based on sound physics and logic, entitles him to be recognized as the first long-range forcaster whose methods were in complete harmony with the present state of physical science.

Here is a brain fully 100 years in advance of its age. It is, I believe, generally admitted that Franklin had the best brain on the American continent.—JOHN A. WALKER.

VAIN PHILOSOPHY.

It is a fine thing, says the New York *Mail*, to preach the philosophy of rest to a generation that is not permitted to rest. The author of the beautifully printed little book, *The Philosophy of Rest*, ignores the fact that the men of this generation are not working overtime because that is what they want to do, but because it is necessary in order to take good care of people who are dear to them, or whose claims upon them are recognized by society. Verily, they have their reward.

This generation is not, as to its rank and file, running the wheel of hustle, it is under it. The business or professional man or employe who adopts the philosophy of Oriental quietism urged here will find himself and his family ere long in the quiet shades of the poorhouse.

Nevertheless, all that the book says is true.

Father in heaven who lovest all,
Oh help Thy children when they call;
That they may build from age to age
An undefiled heritage!

Teach us to bear the yoke in youth
With steadfastness and careful truth;
That in our time, Thy Grace may give
The Truth whereby the Nations live.

Teach us Delight in simple things,
And Mirth that has no bitter springs;
Forgiveness free of evil done,
And Love to all men 'neath the sun!

Land of our Birth, our Faith, our Pride,
For whose dear sake our fathers died;
O Motherland, we pledge to thee
Head, heart, and hand through the years to be!

The above is clipped from Kipling's new book, and is in fine form. It is not so great or so grand as his "Recessional," but it is smooth, attractive, wholesome, and of universal application.—JOHN A. WALKER.

THE slipping of leather faced clutches of automobiles is prevented by the use of Dixon's Paste Belt Dressing—known for over a quarter of a century as Dixon's Traction Belt Dressing. This dressing will keep the leather soft and flexible and smooth acting. It has been most successfully used on leather faced brake bands.

CAN YOU BEAT THIS RECORD?

Again referring to the question that is often asked the writer concerning re-orders of axle grease, it seems that the following case is a good answer.

Mr. Williams of Sulphur Springs, Texas, has sold Dixon's Axle Grease for a good many years. He has written us some very enthusiastic letters on this subject, in which he has said that it is the only axle grease that he handles and he thoroughly believes in it.

In looking up Mr. Williams' sales the other day we find that during the past five years he has averaged three hundred and sixty one and two-pounds cans a year, and we found on referring to the *Gazetteer* that Sulphur Springs, Texas, has a population of thirty-six hundred; this certainly seems to be a record. If you know of any case that beats this we would be glad to hear of it.

THE reason why amorphous graphite makes trouble, and Dixon's flake graphite saves trouble is, because amorphous graphite carries with it a large percentage of clay. The clay forms into a sticky, gluey mass in engine cylinders.

Dixon's Flake Graphite carries with it only mica, which like flake graphite is impervious to the action of the steam and oil; it forms no deposit, but saves oil and improves lubrication.

THE FAILURE OF A SUCCESSFUL BUSINESS.

Sometime ago R. G. Dun & Company's weekly report had the following: "The average life of a successful general store is twenty years—then it fails."

Elbert Hubbard, who delights in a new sensation, got it in what he calls this "pleasing puzzle." In his usual way Hubbard turns this puzzle over and over, he pulls it one way and another and pushes it here and there. He examines it at a distance and close to. When he feels that he has worked it out to his entire satisfaction he tells us what he thinks of it in his own clever and unapproachable way. We should like to quote all he says, but space forbids.

Mr. Hubbard considers that in the early and middle life of a business success is made possible because of the close attention of the owner and the diligence and hard work of the owner and his wife. The business grows, keeps on growing, finally the very success of the business leads to carelessness and inattention. Clerks are hired who do not give the business the necessary attention. Too much lime gets into the old man's bones, and his wife goes visiting. Finally the successful business fails due to dead stock, bad accounts, pilfering clerks, pinching setters and lime in the bones of the boss.

Then Hubbard begins to generalize and says that success in business nowadays turns on your ability to systematize.

"John Wanamaker, one of the most successful merchants the world has ever known, knows every night just what department of his vast business is paying and what not.

"The business of John Wanamaker owes its success to system. No business long remains greater than the man who runs it. And the size of the business is limited only by the size of the man. Without system the most solid commercial structure will dissipate into thin air.

"The Gould System, the Vanderbilt System, the Hill System, the Harriman System, the Pennsylvania System—they are all rightly named. It is system that makes a great business possible. When Jay Gould gathered up a dozen warring, struggling streaks of rust and rights of way and organized them into a railroad system, he revealed the master mind.

"The measure of your success is your ability to organize, and if you cannot bring system to bear, your very success will work your ruin.

"'The average life of a successful general store is twenty years—then it fails'—and it fails through its lack of system, the man does not grow with his business. An army unorganized is a mob. Napoleon's power lay in his genius for system, and he whipped the Austrians, one against three, not only because he knew the value of time, but because he had the ability to systematize.

"The department store where there is a system which tells every day, every week or every month just what each department pays, is the safest business that exists. If any one department does not pay it is reformed and made to pay or else eliminated.

"No big business can possibly succeed unless it is divided up into departments. A non-paying department is not allowed to continue and drag the whole concern down to bankruptcy."

"Character is what we make
For ourselves;
Reputation is what we make
For some one or something else."

BAKING THE PATTERN IN A DRY SAND MOLD.

Question.—We understand that some parties are making cast gears in dry sand molds and leave the iron pattern in the mold while it is being baked. It is claimed that the pattern expands sufficiently to enlarge the mold, so that when cold the pattern can be readily withdrawn.

What facing or coating is used on the gear patterns to prevent the sand from adhering?

Answer.—A good black wash with plenty of plumbago on the surface of the pattern will allow the pattern to be withdrawn.—*Foundry.*

In the matter of plumbago, which is only the old-time name for graphite, the best, and in every way the most satisfactory, results will be obtained if Dixon's Ticonderoga Graphite is used. Try it.

WHEN IN 1680 a Spanish engineer proposed to deepen the channels of certain rivers and to restrain their overflows in the interest of navigation, the Spanish Council decreed as follows: "If it had pleased God that those rivers should have been navigable, He would not have needed human assistance to make them so; but as He has not done it, it is plain that He does not want it done;" and the improvements were forbidden.—*The Gleaner, Jamaica, W. I.*

THE ADVANTAGE OF FALL PAINTING.

The falling leaves and decaying vegetation at this season of the year should do more than merely herald the approach of Winter. To the practical business man they should not only be a reminder that coal for the house, and heavy clothing for the body are necessary for comfort, but that an overcoating of protective paint is a matter of vital necessity to metal work exposed day and night to the rain, ice and snow of the Winter months.

The surface of the earth is dotted with varied and costly building and bridge constructions of materials subject to rapid decay from the great heat of the sun, the moisture of rain and snow, and the destructive workings of the gases of combustion incident to manufacturing and transportation enterprises. Of the materials of construction, metal and wood deteriorate most rapidly, but their strength can be prolonged permanently by the application of a preservative consisting of nature's pigments and oils.

The weakening effect of rust on steel work and metal surfaces is a source of expense and annoyance to those who do not practice thorough methods of protection. The rain and snow storms of Winter with their excess of moisture, naturally result in the corrosion of metal surfaces on which the protective paint has peeled, blistered, cracked or weakened by long weather exposure or other rust-producing agencies. It is the heat of the Summer's sun that brings about most rapidly those changes which result in the loss of elasticity and protective power in paint coatings, exposing the metal surface to the moisture of Winter.

Paints applied in the Fall dry about as quickly as in the Summer, yet the complete oxidation of the upper portion of the film is not hastened as it is in the hotter days; therefore the original elasticity is maintained longer and the coating is much more durable. The clear, dry weather and absence of sudden showers during the Fall season, provide conditions most favorable for the proper application and drying of paints.

Particular attention should be given to the selection of reputable painters, and the paint that has been proven by the test of time to withstand the storms of Winter and the heat of Summer. The practical painter will tell you of the protective and wearing qualities of Dixon's Silica-Graphite Paint for roofs, cornices, buildings, fences, smoke-stacks, water towers, bridges, and all structures of metal and wood construction.

While durability is the true measure of the value of any protective coating, yet ease of application and good covering power are very important factors. These three qualities in the highest degree are to be found in Dixon's Silica-Graphite Paint, which has been successfully used in all climates for over forty years in resisting the destructive chemical action between metal and oxygen.

Dixon's Silica-Graphite Paint is manufactured in but One Quality—The Highest Standard. The four Dixon Colors, Olive Green, Natural, Dark Red and Black, are guaranteed to be of correct proportions of the best pigments and linseed oil that can be used in paint making.

Ease of application, good covering power and effective protection for a long period of time, prove Dixon's Silica-Graphite Paint to be the most economical preservative coating for metal and wood that has ever been produced.

The paint-destroyers and rust-producers—sun, rain, ice, snow and gases, can be successfully resisted for many years by the application to all classes of metal work of any of the four colors of Dixon's Silica-Graphite Paint.

Specifiers and users of preservative coatings desirous of securing best results in Fall Painting, should write for a free copy of "Colors and Specifications," showing the four colors of Dixon's Silica-Graphite Paint, with practical specifications for Construction and Maintenance Painting.

FUNNY, WASN'T IT?

Coming down from my summer cottage in the Adirondacks last week, I drove 12 miles to reach a trolley line which, in due course, if all went right, reached the steam railway depot. Midway and about 6 miles from anywhere. the trolley collapsed and left all hands stranded in the woods. I was depending on the trolley ride to catch my train for Albany to reach New York the next morning, where I had an important engagement. It was, however, no use, the trolley was stalled for keeps, and to get there on time was impossible. I fretted in some talk with the conductor, explained my New York appointment, that it must be kept, but he said impossible, and he couldn't keep it. When I finished talking, a good-faced intelligent countryman with sun-browned cheek and shrewd, twinkly eyes, who had overheard the conversation, said: My friend, you are not young, and neither are you old, but is this really the first time in your life you have been disappointed—the first time your plans have been frustrated? Funny, wasn't it?—JOHN A. WALKER.

GRAPHITE is the best solid lubricant known to science or practice. Of all forms of graphite the Dixon, thin flake, Ticonderoga graphite is conceded by all experts to be the very best.

A BIG TIME RECORD.

Next year, in 1907, the Dixon Company can celebrate its eightieth birthday; it will then be four-score years old. That is a longer consecutive practice of the graphite business than any other concern in this country, or in the world, can point to, and very nearly twice as long as that of the oldest other.

We were very pleasantly reminded of this the other day by correspondence with the well known brass foundry firm Henry Wray & Sons, Rochester, N. Y., in which they mentioned that they were in the third generation of the Wray's, that their house was between sixty and seventy years old, and they had used the Dixon Crucibles all that time, and thought they could claim longer consecutive use of Dixon Crucibles than any other brass founding firm. They had fortunately kept some old time crucibles made between fifty and sixty years ago, and were kind enough to express us one, made, they supposed, before the year 1850. This crucible has arrived and we have it now as a genuine curiosity, as our own product of that date had all passed out of our hands. The shape and form and style of this last century Dixon Crucible is quite different from the crucibles called for now by the severe melting practice of these latter days. We exchanged a very pleasant correspondence with the Henry Wray & Son firm, and in this way now, send them our best wishes and kind regards.—John A. Walker.

DIXON'S ENGINEER.

And His Experience with Amorphous Graphite.

The Dixon Company makes use of the very finest and choicest amorphous graphite produced anywhere in the world; it is the very best Mexican graphite.

It has been said that a prophet is never without honor except in his own country, and so it happened that the chief engineer of the Dixon Company fell in love sometime ago with this choice Mexican graphite. He asked for some and obtained it.

He put a small portion of this choice Mexican graphite in the palm of his hand and rubbed it up and came to the conclusion that it would prove to be better than Dixon's Ticonderoga Flake and therefore he used it, and he used it prejudiced in its favor. After a month or so he began to have trouble and on opening his cylinder and bearings, where this choice Mexican graphite had been used, he found a pasty mass which seemed to be anything but a lubricant.

This pasty mass, when placed in the hands of the chemist, was found to be made up of cylinder oil or engine oil, as the case might be, and an amorphous graphite exceedingly smooth and slick but carrying with it a percentage of clay which had acted as a binder, forming the pasty mass and balls of graphite.

In Dixon's Pure Flake Ticonderoga Graphite there is not a particle of clay. That which is not Flake Graphite is a flake mica, therefore there is nothing to act as a binder nor to cause trouble in any way.

In engine cylinders, where Dixon's Flake Graphite and oil are used, there will be better compression, and the surfaces will be smooth and ideal in every way.

Joseph Dixon Crucible Co.'s
San Francisco Salesroom, 304 Market Street,
Before the earthquakes and fire of April 18, 1906.

Joseph Dixon Crucible Co.'s
San Francisco Salesroom, 304 Market Street,
After the earthquakes and fire of April 18, 1906.

WHERE COLORS COME FROM.

The cochineal bug furnishes many of the most brilliant colors, including the bright carmine, crimson, purple lake, and scarlet. The cuttlefish gives the sepia, and Indian yellow comes from the camel.

Ivory chips produce ivory black and bone black, and the exquisite Persian blue was discovered accidentally by fusing horses' hoofs and other refuse animal matter with impure potassium carbonate. Crimson lake comes from the roots and barks of certain trees; blue-black from the charcoal of the vine chalk; and Turkey red comes from the root of the madder plant found in Hindustan. India ink is made from burned camphor by the Chinese.—*Exchange*.

TWO CARBONS, SUGAR AND GRAPHITE.

Something of Interest About Both, and Also Something About High Temperatures.

In *Harper's Monthly Magazine*, for October, 1906, we are told that molten iron dissolves carbon; so does boiling water dissolve sugar. On cooling the supersaturated iron deposits its dissolved carbon; so does the cooling water deposit its sugar. The water deposits its sugar in the crystalline condition—as rock candy—the iron deposits its carbon chiefly as graphite.

The object to be attained is to make the iron deposit its carbon in the crystalline form, for crystallized carbon is diamond. This is what the great chemist Moissan accomplished in his experiments (as described in a previous issue of GRAPHITE)—microscopic form it is true, but absolutely diamond.

There was a time when man knew no higher temperature than that which he obtained from the burning of leaves and brushwood. At the present time man has produced a temperature of 5299 C. (9392 F.), but even this is insignificant compared to the heat of the heavenly bodies of which the sun is by no means the hottest.

For further information in what high temperatures are doing for modern industry we recommend our readers to the magazine from which we have quoted the above.

AIR COMPRESSOR LUBRICATION.

Sometime ago, in the course of an article on "Temperatures in Air and Ammonia Compressor Cylinders," which was published in the *Engineering Magazine*, Mr. Leicester Allen, the author, wrote:

"One of the dangers in air compression which has not been fully recognized until within a quite recent period, is the liability to explosion in air-compressor cylinders when the heat of compression is caused to exceed the flashing point of the oil used for cylinder lubrication. Several more or less serious accidents of this nature have been recorded within a period of three or four years."

Another writer, Mr. Alex. M. Gow, M. E., in the *Engineering News* said: "Ignitions and explosions in the discharge pipes and receivers of air compressors are by no means uncommon, and for very obvious reasons the manufacturers say as little as possible about the subject to prospective buyers. It cannot be expected that the men in charge at the time of accidents will make any report that will reflect upon themselves. So it happens that in but comparatively few cases of these accidents, have the results of careful investigations been given to the world at large." The matter is, nevertheless, brought up for discussion from time to time in engineering papers, and the facts presented strongly emphasize the necessity for a clearer understanding of conditions and causes of explosions in compressed air systems on the part of those operating them.

The causes of ignitions and explosions in discharge pipes in air receivers, and the function and the value of Dixon's Flake Graphite as an air cylinder lubricant from the theoretical as well as the practical standpoint, is very fully and fittingly set forth in an entirely new pamphlet issued by the Joseph Dixon Crucible Company of Jersey City. It is entitled "Air Compressor Lubrication."

Manufacturers of air compressors and users of air compressors, drills, etc., will be on the wise side if they at once send for a copy of this pamphlet.

"I WOULD NOT LIVE FOREVER."

Written for "Porter's Spirit of The Times."

By FINLEY JOHNSON.

I would not live forever;
 No, "blow me," if I would!
Where "fancy men" can't manage things
 "As once they used to could."
Now when I was a youngster,
 The old folks used to think
There was no harm in every man
 Taking a social drink.
But sentiments have altered,
 In these "degenerate days;"
And ev'rything and ev'rybody
 Have got contrary ways.
And they would make us mortals here
 Our favorite drinks discard;
And make us quaff their *water, soft,*
 For fear we'd drink *too hard.*

I would not live forever,
 In this dark world of sin;
Where people seem to *take* a pride
 In *taking* each other in.
And if a stranger stares about,
 With eyes out of his sockets,
He's sure to *pick* some straggler up
 Who's sure to *pick* his pockets.
Then, who would live upon this sphere
 With such a motley crew,
Who seem as if no work they had
 But that of watching you?
Not I, for one; and I think that all,
 From such, would like to sever;
And join in saying, I would not live
 Upon this earth forever.

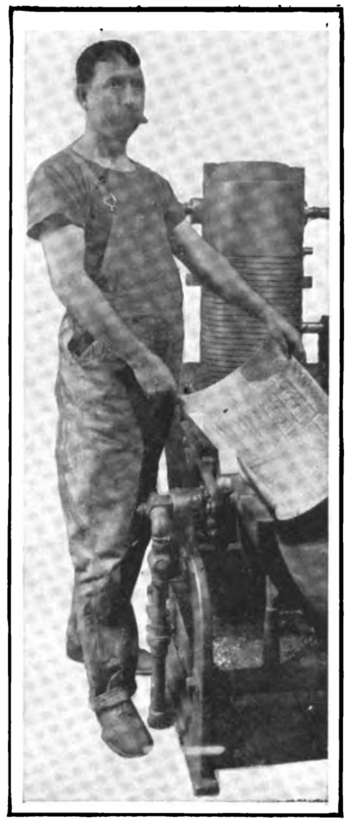
—*Porter's Spirit of The Times*, March 14, 1857.

BALTIMORE, MD.

The above is contributed by Mr. Sam Mayer, manager of the Chicago office of the Dixon Company, and an antiquary of note. Mr. Mayer remarks that after all human nature is always about the same—prone to kick.

THE RAILROAD ENGINEER.

THE PRINTER.



THE STEREOTYPER.

THE IRON MOULDER.

ALL THE WORLD USES DIXON'S GRAPHITE.

Illustrations Secured Through Courtesy of Leslie's Weekly.

There is probably no other single substance which is adapted to so many diverse purposes as graphite. It serves mankind daily in his work and his play. At some point it touches his necessities and his luxuries.

The Dixon Company has for eighty years devoted itself to the development of the graphite industry. Perhaps few realize the scope of this industry and its relation to other industries.

The great daily newspapers that keep the public in touch with the world's doings find Dixon's Graphite of value from engine room to printing press in getting out their big editions. It lubricates the complicated linotype which casts and sets the type. It is used in fact on all typesetting machines. Often it proves a blessing when in the final rush of getting the last forms to press some part of the machinery sticks or runs hard. In such emergencies, Dixon's Graphite smoothes out the difficulties by giving the troublesome friction surfaces an unctuous coating that enables them to glide over one another easily. In this way it assists in getting your daily paper to you on time.

The electrotyper could not dispense with graphite, or "plumbago," as it was known in the early days of electrotyping. It facilitates and makes economical the printing of the large editions of the weekly and monthly magazines, permitting the duplication of type matter by means of electrotyping and thus allowing many presses to print the same matter at the same time. Made up into pencils, Dixon's Graphite serves the editor, his stenographers, reporters, and the entire clerical force.

The statement that Dixon's Graphite lubricates the wheels of commerce and traffic may be quite literally interpreted. The locomotive engineer uses it in the engine cylinders, on bearings and pins. One hot pin can stall the most powerful of locomotives. But Dixon's Graphite will quickly cool the pin and prevent delay and damage. Its regular use will obviate such occurrences.

The air brake system which safeguards human life is kept in perfect working order by the use of Dixon's Graphite. The engineer uses it on his air pump and it is also applied to the triple valves which directly control the action of the brakes.

The stationary engineer avails himself of Dixon's Graphite as a lubricant to keep his engine at highest efficiency with least wear and tear.

On the marine engine Dixon's Graphite offers some very decided advantages. It is used with perfect safety in the engine cylinders, for—unlike oil—it will not cause trouble in the boilers.

In the working up of metals, Dixon's Graphite plays an important part. The remarkable heat-resisting properties of graphite well adapt it to the manufacture of crucibles, retorts, phosphorizers and the like for melting, tempering, brazing, etc. With these go graphite stirrers and skimmers for stirring and skimming alloys.

In order to produce good, clean castings free from blow holes, hard spots and like imperfections, the moulder makes use of Dixon's Graphite. Graphite as a facing is put on the surface of a mould to prevent the adhesion of the metal to the mould. The qualities demanded of a good facing make graphite most desirable for this purpose.

Dixon's Graphite is also made up into a cement for patching up worn out furnace linings, for lining up ladles, and for mixing with ordinary clay for tap hole mixture. Made into refractory bricks it is used for furnace lining. In stove foundries it gives additional service as a polish for stoves and protects them against rust.

THE STONE CUTTER.

THE CARPENTER.

THE PLUMBER.

THE PAINTER.

Wherever you find machinery, there you will find need of Dixon's Graphite. For reducing friction it possesses properties peculiar to itself. By attaching itself directly to the friction surfaces and filling up the microscopic irregularities it gets at the source and cause of friction. This action entitles it to be termed the "positive principle" lubricant.

Around the machine shop Dixon's Graphite serves a multitude of lubricating functions. On bearings and journals of almost every description; on gears, elevator and hoisting cables—wire and rope. Machinists find it valuable to prevent cutting of lathe centers; it is also used on "v's" of planers for a similar purpose.

In all allied mechanical branches Dixon's Graphite forms an indispensable aid, chiefly in overcoming friction losses which would otherwise reduce the efficiency of machinery and proportionately increase cost of production.

Metal workers make use of large pencils and crayons made from Dixon's Graphite for marking the metal. Lumbermen employ like pencils for marking lumber.

The mason finds occasion for Dixon's Graphite in the making of black cement or mortar. In fact, graphite is widely used as a coloring material. On coffee plantations it is used as a harmless coloring agent to give uniform color to the coffee bean. Progressive Japan realizes its value and employs it for coloring certain grades of tea. It is as pure and healthful as charcoal. Its durability recommends it to hatters in preparing dyes.

The carpenter's chief use of Dixon's Graphite is in the form of pencils which are made especially for his requirements. The plumber follows and uses Dixon's Graphite in a pipe-joint compound for making up joints. For this purpose it possesses a marked superiority over red or white lead in that it never "sets." Joints may thus be opened whenever desired without loss of time or damage to tools or fittings. Its lubricating qualities also permit of joints being screwed up tight. These advantages of Dixon's Graphite are very generally recognized in factories where long lines of steam, gas, water, or air piping occur.

The resistance offered by graphite to heat and cold and all corrosive agencies naturally makes it invaluable to the painter as a pigment. An additional advantage possessed by graphite as a paint pigment lies in the fact that it is inert and thus no detrimental chemical action takes place between the graphite and the oil.

The massive steel framework of the modern building, the superiority of which was clearly demonstrated in the San Francisco disaster, depends for its permanent strength upon a perfect preservative coating. Thus does Dixon's Graphite lend its helping hand to architectural progress. Steel bridges, viaducts, smoke stacks, gas holders and the like would soon succumb to Nature's destructive forces if unprotected in any way. Dixon's Graphite in the form of paint stays Nature's hand and preserves man's work. With the extended adoption of steel cars, railroads are becoming greater users of Dixon's Graphite as a paint pigment for protecting these cars. Mixed with shellac, Dixon's Graphite is applied to the bottom of yachts and other crafts. Here it not only offers protection but reduces "skin friction," permitting greater speed in traveling through the water.

Dixon's Graphite has made itself generally useful in electrical work. Under favorable conditions it proves the very best material for dynamo and motor brushes. Both its conductivity and lubricating qualities make it desirable for this purpose. Resistance rods are made from Dixon's Graphite. It is also used for pistons of arc lamps such as light our city streets. Boxes for baking carbons and incandescent lamp filaments are made from graphite; also "forms" on which these filaments are wound before baking. In this connection it is used as a powder to prevent the exhaustion of the life of carbons and lamp filaments while baking. A cement made

THE MACHINIST.

THE BLACKSMITH.

THE RAILROAD FIREMAN.

THE ELECTRIC LINEMAN.

from Dixon's Graphite is used in repairing incandescent lamps. One may readily see from this what an important factor graphite is in our modern system of electric lighting.

Again in various lubricating compounds, Dixon's Graphite is used by traction companies for curves, switches and gears of electric car motors. On the latter it prevents that disagreeable grinding, whirring noise that one frequently notices while riding on the "trolley."

With the more domestic industries Dixon's Graphite is found closely associated. The blacksmith and wagoner probably find their greatest use for Dixon's Graphite prepared as axle grease. The vehicle owner finds it valuable because of its durability and cleanliness, the horse appreciates the easy running carriage that results from its use. Incidentally it may be mentioned that Dixon's Graphite has been found a good "horse medicine" and in axle grease form is used with good results for gall sores and as a liniment.

The garage and auto repair shop that are to some extent replacing the stable and blacksmith shop follow their predecessors in the use of Dixon's Graphite. It keeps the car running smoothly, easily and quietly, adding much to the pleasures of motoring. The bicycle and motor cycle owners also use Dixon's Graphite for general lubrication.

The baker finds use for Dixon's Graphite made up into stove cement for his ovens. Thus we see that graphite is an element in the production of the "staff of life." The housewife finds a like use on a smaller scale for graphite stove cement in patching up stove lining, also graphite stove polish.

Dixon's Graphite quite materially assists about the home. On clock springs it helps the clock keep correct time. Also good for springs and bearings of the popular talking machine; for sewing machines, hinges, cupboard and cabinet drawers, and anything that sticks, squeaks or runs hard. Dixon's Graphite is the housekeeper's handy help.

The sportsman uses Dixon's Graphite on the mechanism of his gun. In chambers and lock mechanisms it prevents sticking of unburnt powder, dust, and paper shells. It is good for lubricating reels of fishing rods, oar locks, etc. Many petty annoyances that beset the sportsman and hinder his sport, are avoided by the use of graphite.

One readily gathers from the foregoing how democratic and versatile Dixon's Graphite is. To those who may so desire, we shall be glad to send detailed information concerning Dixon's Graphite in any particular field.

ONE of the strangest cargoes a vessel could have was recently unloaded at London. It consisted of several sacks filled with dried flies, to be used in the manufacture of food for chickens, cage birds, and the like. The flies were caught on the river Amazon, by Brazilians. Flies hover in dense clouds over many of the swampy reaches of the Amazon, and they are captured by the million in gauzy nets. They are killed, dried in the sun, and then placed in sacks and shipped to London, where they are mixed with millet and other grain, and sold as chicken food, etc. Sometime ago the Brazilian government, fearing that the fish in the Amazon river would suffer from the fly trade, forbade the exportation of flies. Hence the price of this strange commodity, which used to be sixpence per pound, has now risen to a shilling and a half, and often a little more.—*Scientific American.*

NOVEMBER.

"Now goes the golden autumn far away;
Now nearer comes the winter to my door;
And thus does Nature, working evermore,
Create new life from changes and decay."

HOTEL BELMONT, Park Avenue, 41st to 42d Streets, New York City.
WARREN & WETMORE, Architects. F. A. BURDETT, Consulting Engineer. MARC EIDLITZ & SON, Contractors.
Structural Steel Protected with Dixon's Silica-Graphite Paint, Natural and Olive Green Colors.

Street Railway Section, pages 724-736.

Graphite.

Vol. VIII. DECEMBER, 1906. No. 12.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

Mr. Samuel H. Dougherty,
Manager St. Louis, Mo., Office,
Joseph Dixon Crucible Co.

To meet growing business demands in St. Louis and the South and South-West, the Joseph Dixon Crucible Company has opened a St. Louis office with Mr. Samuel H. Dougherty as manager, and Mr. Thomas Findlay as his assistant.

The office is located in the Victoria Building, corner of Eighth and Locust streets, and in this office a full line of samples of graphite products will be on exhibition, and all the Dixon catalogues and circulars.

Mr. Dougherty will still look after all business throughout his territory, and will be away from the St. Louis office frequently, but some one will always be "at home" in the St. Louis office ready to give prompt attention to all inquiries and to attend to all business matters.

The long term of years that Mr. Dougherty has been with the Dixon Company, and the large and wide experience he has had, peculiarly fit him for the new position, and the establishing of this office is an expression of the confidence in which Mr. Dougherty is held by the Joseph Dixon Crucible Company.

HOW THE TELEPHONE WAS INVENTED.

In a recent lecture Prof. Alexander Graham Bell is reported to have explained, as follows, how he came to invent the telephone:

"My father invented a symbol by which deaf mutes could converse, and finally I invented an apparatus by which the vibrations of speech could be seen, and it turned out to be a telephone. It occurred to me to make a machine that would enable one to hear vibrations. I went to an aurist, and he advised me to take the human ear as my model. He supplied me with a dead man's ear, and with this ear I experimented, and upon applying the apparatus I found that the dead man's ear wrote down the vibrations.

"I arrived at the conclusion that if I could make iron vibrate on a dead man's ear, I could make an instrument more delicate which would cause those vibrations to be heard and understood. I thought if I placed a delicate piece of steel over an electric magnet I could get a vibration, and thus the telephone was completed.

"The telephone arose from my attempts to teach the deaf to speak. It arose from my knowledge, not of electricity, but as a teacher of the deaf. Had I been an electrician I would not have attempted it."

St. Louis Office, Joseph Dixon Crucible Co., Victoria Building.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

BRANCHES AT

68 Reade St., New York. **1020 Arch St., Philadelphia.**
26 Victoria St., London. **San Francisco, Cal.**

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* **JOHN A. WALKER,** *Vice Pres. and Treas.* **GEO. E. LONG,** *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., December, 1906.

THE SIGNS OF THE TIMES.

Abundance, and material prosperity, have been the order of the day for the United States for several successive years, and certainly with emphasis for the year 1906, there has not been one cloud even in the industrial sky. For the new year to come, 1907, the outlook is equally optimistic.

There are in our opinion two important reasons for this state of affairs. The first reason concerns the hand of Providence, which now, for nine successive years, has provided the country with good crops. This is at the foundation of everything.

Going on uninterruptedly now for these nine years, there has been taken out of the earth, new stuff worth as the years have rolled on, from three billion of dollars in 1898 up to five billion or six billion of dollars in the year 1906. This has lubricated the wheels of everything. The farmer and the miner has paid his debts and has had a surplus to spare for new equipment on the farm, and the mine, and better things for his family and his house. This made him the good customer of the manufacturer, and so on through the millions and millions of ramifications the modern structure of industrial supremacy has been kept up. This much by the hand of Providence. That is, crops have been guaranteed by favorable winds and weather.

The next reason in our judgment, was the inspiration that came at that time, to all the industries alike, to consolidate. What are called the Trusts have in many quarters been pointed at as with a by-word and hissing. Foolish men's mouths have frothed in vindictive characterization, and the minds of many good and wholesome men have been warped to words of criticism or bitter opposition, but the day will come when all alike will, in proper perspective, see how perfectly the newly consolidated industries utilized the abundant gifts of Providence and made the utmost of the opportunities thus created.

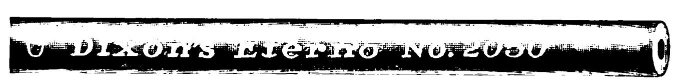
The industries before this era were like the railroads forty years ago, each little road was run separate from every other road, and without co-operation of any kind, and so it was with the industries, each stood separate and alone and by it self, and every gust of unfavorable wind blew them down by the scores, and so it came to pass that every ten years the cycle evolved and brought the tidal wave of destruction. So much so that the periodical ten years was always looked forward to with alarm and a sense of danger.

With 1894 and 1895 came the era of consolidation and when these giant consolidations were perfected, each separate industry was then buttressed by the united strength of all. The best constructive brains in the separate industries, who before spent their best time and strength in trying to get the best of each other, now co-operated, and the progress made was in geometrical order. All the consolidated industries now have the benefit of the best thinking of the best managed plants. The new and best methods were introduced everywhere. This reduced the labor, extended the sway of the best processes, superseded the destructive and destroying competition by this consolidated energy. The new methods prevailed everywhere, and with the old methods the old machinery was "scrapped" and new quickly introduced.

The foundation of prosperity thus started, the streams have fertilized every attending department. The cycle year for depression, in 1903, arrived and was passed without a quiver. The recurring good years and bad years of the old days have disappeared. Labor is perennially employed, and also employed at its utmost capacity. Wages have advanced everywhere, and never before was the standard of living and home comfort so high. Never before did the rank and file have so much leisure time, never before did they eat and drink and dress and amuse and house themselves so well, and never were their savings so ample.

This is the holiday lesson, these are the signs of the times. Remember the hand of Providence, which supplements man's labor so well and think it over, how man's combining minds make such fine use of his unusual opportunity.

—JOHN A. WALKER.



This is Dixon's well known and universally liked indelible pencil. Writes black, copies purple. It combines the convenience of the pencil with the permanence of ink. You can sign a check with Dixon's "Eterno" and the bank will consider the signature legal.

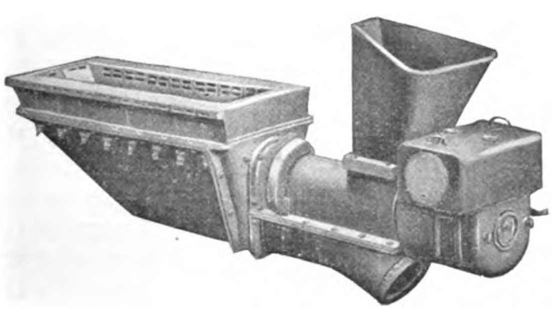
AUTOMATIC STOKERS.

There never was a time in the history of human industry when the subjects of smoke prevention and fuel economy have received the study and attention that they are attracting to-day. Of course, the smoke nuisance is directly due to soft coal, but soft coal is widely and justly regarded as a necessity for steam boilers on account of the almost prohibitive price of anthracite. Smoke is more than a nuisance and a source of damage to property; it represents a waste of volatile combustible matter of the coal itself which may run from 5% to 25% or more, depending upon the various conditions. And again, smoke is the more intolerable because this waste of heat and damage by soot is quite unnecessary. It has been shown by many technical writers that if the following general requirements are met in a boiler furnace, soft coal, high in percentage of volatile matter, may be burned absolutely without smoke:

1. The gases and volatile matter must be slowly distilled from the green coal fed to the fire.
2. These gases must be thoroughly mixed with enough very hot air to supply all oxygen needed for complete combustion.
3. That, while burning, these gases must not become cooled down lest the flame be extinguished and smoke result.

When soft coal is hand fired, the volatile matter is periodically driven off in great clouds as soon as the green coal strikes the hot fire. The air supply through the grates is choked and great quantities of cold air enter the furnace through the firing doors, cooling down the furnace, often as much as 700 degrees. Thus, it appears that, as Kent says in "Steam Boiler Economy," "of all known methods of burning soft coal, the worst is the one most commonly practised, viz.: that of burning soft coal in a common furnace consisting of a set of grate bars and a space of contracted dimensions between them and the heating surface of the boiler, the coal being fed by hand."

Soft coal can be burned without smoke by several mechanical stokers, all of which conform to a greater or less degree with the scientific principles laid down above. As a typical instance of their method of operation the following description of the workings of the American Underfeed Stoker, made by the American Stoker Company, of Erie, Penna., will be of interest to all the readers of GRAPHITE who are concerned with operating steam boilers.



As shown in the illustration, this stoker consists of a hopper which projects from the front of the boiler setting and into which the coal is shoveled by the fireman from time to time. From the hopper the fuel drops into the end of a conveyor pipe in which is a screw conveyor driven by an enclosed steam motor through a pawl and ratchet. The coal is forced by the conveyor into the retort of the stoker, the top of which is about level with the grates of the furnace and which is surrounded with suitable grate bars. Surrounding the body of the retort is a space of a few inches connected with a blower pipe; this is the so-called "wind-box" through which the forced draft from a blower is carried. Around the top of the retort and capping the wind-box are hollow, perforated tuyere blocks of cast iron. Coal enters the furnace under the body and hottest part of the fire, being crowded up through the retort by the conveyor screw. As this green fuel approaches the fire it is slowly roasted and its volatile matter and gases distilled off. These gases necessarily rise, and when opposite the tuyeres are thoroughly mixed with air and forced through an eight to twelve-inch bed of incandescent coke above. They are instantly ignited and completely burned without a trace of smoke.

The coal freed from all its volatile matter is in turn crowded out of the stoker retort by the new fuel, overflows the tuyeres and remains upon the surrounding grates until fully consumed.

Ash is removed periodically by means of dumping grates or through the fire doors.

The success of a smoke preventing device is determined, not alone by the better combustion it affords, but also by the percentage of the boiler's steam it consumes for its own actuation. The power required for driving the blower for forced draft and the conveyor screw of the American Underfeed Stoker represents about 1¾% to 2¾% of the steam generated, depending on the size of the plant, which is very low compared to most stokers and so-called "smoke preventers." However, any saving on this small percentage is of interest to the engineer, and that such savings can be effected by the use of Dixon's Graphite is illustrated by the following letter received from Gordon L. Hutchins, M. E., E. M., Chief Western Engineer of the American Stoker Company:

SALT LAKE CITY, UTAH, Sept. 17, 1906.

The Joseph Dixon Crucible Co.,
Jersey City, N. J.

Gentlemen:—I take considerable satisfaction in offering this testimonial as to the substantial benefits to be derived from the use of graphite in connection with the American Underfeed Stocker.

The Moore steam motor which is used to drive this stoker, when a positive form of drive is not employed, requires the same attention to lubrication as does the ordinary day pump, but the lubrication of boiler auxiliaries is irregularly performed, in the large majority of plants, when left to the firemen. A steam cylinder with a graphite veneer well worked up on its friction surfaces is in good condition to resist, for some time, the bad effects of insufficient oil lubrication. I have found that a little of your No. 2 graphite introduced into our stoker steam lines a few times daily, reduces the amount of cylinder oil over the quantity required when the latter is used alone and unquestionable reduces wear of friction surfaces and the consequent leakage of steam between valve and seat

and also around piston and valve rings. Tests I have made show from 5 to 25% economy in steam consumption graphite treated as against entire cylinder oil lubrication.

My method of feeding graphite to the machine is by the ordinary hand oil pump, about two ozs. of a thin mixture of cylinder oil and graphite per stoker per day—more when starting the treatment.

I am specifying graphite feeds on all our new work and many of our old patrons are adopting the practise at my suggestion.

Very truly yours,
GORDON L. HUTCHINS, M. E., E. M.,
Chief Western Engineer.

At a later day we hope to present the readers of GRAPHITE the details of a new brass crucible furnace fired by an American Underfeed Stoker. The experiments on this furnace have been in progress some months at the foundry of a good Dixon customer in Erie, Penna., and the records established by Dixon crucibles in this experimental furnace have excited the admiration of all connected with the plant.

—G. P. H.

GRAPHITE BRUSHES FOR COMMUTATORS.

The Joseph Dixon Crucible Co., Jersey City, N. J., has issued a booklet telling about the Dixon graphite brushes.

For the convenience of users of Dixon's Graphite Brushes we give the following summary of the conclusions deduced from tests and observations made by Prof. Albert F. Ganz, of Stevens Institute:

"1. Dixon's Graphite Brushes must not be used on the same commutator with carbon brushes.

"2. Before Dixon's Graphite Brushes are applied to a machine the commutator must be given a true and polished surface. A rough commutator will quickly wear away graphite brushes.

"3. No oil, vaseline or other lubricant must be used with Dixon's Graphite Brushes, but the commutator must be kept perfectly free and clean from such materials.

"4. When a new graphite brush is inserted on a commutator its surface should be fitted to the surface of the commutator by means of finest sandpaper.

"5. The brush holder should be so constructed that the entire contact surface of the brush is touching the commutator and that the brush pressure is evenly distributed over the contact surface of the brush.

"6. The brush pressure should not be less than three pounds per square inch nor more than six pounds per square inch. For slow-speed machines with little vibration the lower pressures will give satisfactory results, while for high-speed machines with considerable vibration the high pressures must be used.

"7. Where two or more brushes are used in parallel on one machine it is important that the brush pressure be the same for all brushes."—*The National Engineer*.

SEASONABLE ADVERTISEMENTS.

"Mr. Brown, furrier, begs to announce that he will make up gowns, capes, etc., for ladies' out of their own skins."

"Wanted, a boy who can open oysters with a reference."

CURED OF THE CIGARETTE HABIT BY A LEAD PENCIL.

The following clipping comes to us. We do not know "David," but shall be glad to have all cigarette smokers try the lead pencil cure, and we, of course, suggest the Dixon pencil. In fact, we doubt if any other will effectually work the cure:

"David Bispham has broken himself of the habit of smoking cigarettes in so simple a way that he wants everybody else addicted to the habit to try his method.

"'I used to wonder,' Mr. Bispham said the other day in a voice that proclaimed his desire to give the method all possible publicity, 'whether it was the smoke I enjoyed or merely the sensation of holding the cigarette in my mouth. I decided that it was in all probability only the latter. To cure myself I began by putting into my mouth, whenever I felt like smoking, a piece of pencil and keeping it there until my temporary nervousness passed away. After I had done that for a week I found the pencil just as satisfactory as the cigarette and I decided that it was not the tobacco to which I was a victim. In less than a month I had entirely broken myself of the habit of smoking cigarettes and I have never gone back to them. Whenever I feel a particularly strong longing for one I puff on a pencil for a moment and am satisfied.'"

A HINT TO THE THRIFTY.

Having used different makes of garden hose with the harrowing result that about every two years new hose had to be purchased, I set about experimenting, some five years ago, to find out how to make the hose last and at the same time not bother about reeling it up every time it was used.

I put the all-rubber hose out of the question, and purchased the ordinary three-quarter-inch cotton hose. Then, laying a sufficient length of boards out in the yard to stretch the hose on, I applied a good soaking coat of graphite paint, well thinned out with boiled linseed oil. Letting the hose remain there two days in the hot sun had the effect of drying the outside surface so that it could be put into service, and it is still being used without any signs of decay.

The test was this: About twenty feet of this same hose was left unpainted, and went quite out of commission the second summer.—W. G. K. in New York *Evening Post*.

A SEVEN-YEAR TEST.

Some time ago Baker, Smith & Co., steamfitters, New York City, while connecting the ground floor, store of 68 Reade street, for steam, had occasion to remove a 2¾-inch tap from the main. The tap had been in place for seven years and had been put in by Baker, Smith & Co. The foreman was quite a little surprised when he applied the tongs to find how easily the tap was removed. He soon discovered the threads had been coated with Dixon's Pipe-Joint Compound. The threads were as clean and bright as the day they were put in—seven years before—although subjected to heat and moisture night and day.

The foreman said that invariably they had to cut out a tap of that size when put in with red lead or any compound other than Dixon's Pipe-Joint Compound.

WONDERS OF WATER.

Extract from "Easy Lessons in Chemistry," in "Southern Engineer."

Hydrogen means water-former.

The composition of water is proved by analysis and synthesis, *i. e.*, by separating the compound into its elements and by combining the elements to produce the compound. We can analyze it by passing an electric current through it. By the synthetic method we mix the two gases and unite them by an electric spark. Both methods agree in proving that water is composed of two volumes of hydrogen to one of oxygen. But oxygen is 16 times heavier than hydrogen, volume for volume, and hence the composition of water by weight is as 2 is to 16, or as 1 is to 8. This fact is expressed by the formula, H_2O.

Quantity of electricity required to decompose a single grain of water is estimated to be equal to that in a flash of lightning. The enormous power necessary to tear those two elements from each other shows the wonderful strength of chemical attraction. We thus see that in a tiny drop of dew slumbers the latent power of a thunderbolt. The abundance of water very forcibly attracts attention. It composes perhaps four-fifths of our flesh and blood. Man has been facetiousely described as "twelve pounds of solid matter wet up in six pails of water." All the plumpness of flesh and fairness of cheek are given by the juices of the system. A few ounces of water and a little charcoal constitute the principal chemical difference between the round rosy face of sixteen and the wrinkled, withered features of three score and ten.

When we pass to the lower animals we find this liquid still more abundant. Sunfishes are little more than organized water. Indeed, an entire class of animals to which the jelly-fish, etc., belong is composed of only ten parts of solid matter in a thousand. In the vegetable world we find it abundant. Air-dried wood contains 40 per cent. of water. Bread is 37 per cent. water, and of potatoes and turnips cooked for our dinner, it comprises 75 per cent. of one and 91 per cent. of the other. The following shows the proportion of water in common vegetables, fruits and meats: Mutton, 76 per cent.; beef, 72 per cent.; veal, 78 per cent.; pork, 72 per cent.; eggs, 74 per cent.; oysters, 90 per cent.; salmon, 74 per cent.; apples, 85 per cent.; carrots, 88 per cent.; beets, 90 per cent.; cabbage, 80 per cent.; cucumbers, 96 per cent.; melons, 90 per cent.

Water having of itself no flavor, color or odor, is perfectly adapted to be the general solvent. It becomes sweet, sour, salt, bitter, nauseous and even poisonous. Had water any flavor the whole art of cookery would be changed, since each substance would partake of the one universal watery flavor. As water percolates through the soil into wells, it dissolves the various mineral matters characteristic of the locality. The most abundant of these are lime, salt and magnesia.

That "cold contracts" is the law of physics, but as water cools it obeys this law only as far as 30 degrees F., (4 degrees C.) Then it slowly expands in cooling down to 32 degrees F., its freezing point. Then its crystals suddenly dart out at an angle to each other and thus increasing in size about one-twelfth, it congeals and becomes ice. Ice, therefore, is lighter than water, and consequently it floats.

Hydrogen is the lightest substance known, and oxygen is an invisible gas, yet the two unite and form a liquid whose weight we have often experienced, and a solid which makes a pavement hard like granite. Hydrogen burns readily and when mixed with oxygen explodes most fearfully. Oxygen supports combustion, yet the two combined are used to extinguish fires. Water is so essential to life that thirst causes a lingering, painful death. The uses of water are as diverse as they are practical. Its office is not merely to moisten our lips on a hot day, to make a cup of coffee or tea, to lay the dust in the street and to sprinkle our gardens; it has grander and more profound uses than any of these. Water is the common carrier of creation. It dissolves the elements of the soil and climbing as sap up through the delicate capillary tubes of the plant, furnishes the leaf and bud with the materials for growth.

This is not all. It comes from the clouds as rain, bringing to us warmth from the ocean and tempering our northern climate, while in spring it floats the ice in our rivers and lakes away to warmer seas to be melted. It washes down the mountain side and bears mineral matter to fertilize the valleys. Yet this is not all. It propels water wheels working forges and mills, the grand motive-power of the arts and manufacture. It flows to the seas bearing on its bosom ships whose engines are in most part driven by steam, conducting the commerce of the world. It passes through the arid sands of the desert and brings forth buds and blossoms. It limits the bounds of fertility, decides the founding of cities and directs the flow of trade and wealth.

DANGER IN AIR COMPRESSORS.

In using the single-stage compressor for 100 pounds pressure, says *Mines and Minerals*, there is an element of danger in the high temperature reached in the compression cylinder. Theoretically, the air reaches a temperature of 485° F., and as the water-jackets surrounding the air cylinder have very little cooling effect on the contained air, it is safe to say that a temperature closely approaching this is actually obtained. With this high temperature, unless the lubricating oil has a higher flash point than the usual commercial oils, there is a chance of the compressed air and vaporized oil combining to form a mixture which may explode, wrecking the compressor and sometimes causing loss of life.

For those who are interested in this very important subject, and those who have personally experienced the difficulties and dangers of operating compressors and desire to avoid further trouble, we have prepared a pamphlet entitled "Air Compressor Lubrication."

In this pamphlet are considered:

First. The causes of ignitions and explosions in discharge pipes and air receivers.

Second. The function and value of Dixon's Ticonderoga Flake Graphite as an air-cylinder lubricant from the theoretical as well as the practical standpoint.

Third. Methods of feeding flake graphite, and

Fourth. Some secondary advantages in graphite lubrication as suggested by the application of compressed air for special purposes.

A chapter is also included on the practical benefits of graphite lubrication for rock drills.

THE STEAM LOOP IN THEORY AND PRACTICE.

By W. H. Wakeman.

My object in writing on this subject is to assist men in charge of steam machinery to understand the apparatus that they control, as it is well known that men can be found in charge of such machinery who know little or nothing of the principles which govern its operation, therefore so long as it works well they give it no study, and when it fails there is no time for study, as it must be put into operation by somebody who does understand it, without delay.

The necessity of calling in help in such an emergency always operates to the engineer's disadvantage, for it is taken as a true indication that he does not understand his business, and may account for many instances in which he is not consulted when new apparatus is to be installed, as the result of close observation of these matters for a long time convinces me that, as a general rule to which there are very few exceptions, a steam user is always willing to consult his engineer in such matters, provided he has good reason to believe that he will receive sound advice and sensible information. If the engineer is not well informed on subjects to be discussed he is not consulted.

The steam loop was invented in 1871 by James H. Blessing, who expected to set the boiler of a heating and power plant in a pit low enough to allow water from even the radiators and pipes on the lower floor to gravitate into the boiler, thus requiring little or no attention from the engineer, but found that in order to do this it would be necessary to set the boiler so low that the fire box would be covered by water every time the tide came in, unless it was set in a tank, which was not practicable.

Efforts were made to return the water of condensation from the radiators to the boiler by means of a diaphragm trap illustrated in Fig. 1. Water from the radiators entered

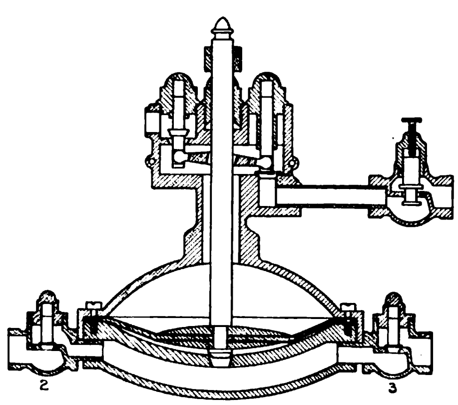


FIG I

through the check valve *2*, and filling the lower part of the trap raised the diaphragm shown, and when it had nearly reached its highest point the steam opened a live steam valve that admitted boiler pressure to the space above the diaphragm, which forced it downward, and as it could not return through *2* it had to go through *3* to the boiler.

The steam thus used did not mix with the water and go with it into the boiler, but was exhausted into the atmosphere, the same as from the cylinder of a modern steam pump. This plan not only wasted heat, but made it necessary to add much fresh water to replace what went to the atmosphere.

While experimenting with this trap Mr. Blessing noticed that when receiving cool water that came from the heating system first, it required but a few minutes to fill the trap, but after it had been in operation for some time it did not fill so quickly. Furthermore, during the former time the inlet check valve worked more noisy, thus denoting that for a greater portion of the time steam and water mixed were passing into the trap.

The next step in the reasoning process was to note that if this mixture was conducted into a larger vessel, the water would quickly settle to the bottom, then if it was located above the water line, this water would flow into the boiler, provided a suitable feed pipe was installed.

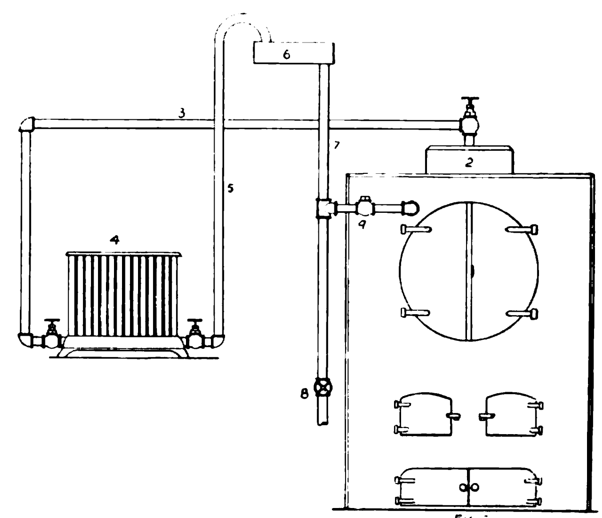


Fig. 2 illustrates this idea in which *2* is the boiler that supplies steam through the pipe *3* to the radiator *4* where some of it is condensed. Steam and water are then forced upward through *5* to the receiver *6* where they separate, and after the water has fallen to the bottom it descends through *7*, and as the valve *8* is closed during a greater portion of the time it passes through the check valve *9* and enters the boiler, thus maintaining a circulation as long as steam is supplied.

If we send a solid body of water into *5* the apparatus will not work as above described, because the weight of it will cause pressure to increase at the base, and at the same time decrease it to an equal amount in *6*, therefore it will not flow against boiler pressure. To overcome this objection the valve *8* is provided and is opened when steam is first turned into the radiator *4*. This releases all pressure at *7* and causes steam and water to quickly travel through the whole system and pass to the sewer, or other suitable place. When circulation is fully established and hot water appears at the outlet, *8* is closed causing water to go to the boiler.

When installing a steam loop, or endeavoring to find the cause of failure to operate in one that has been used, the following point is very important and must not be overlooked. There must be pressure enough at the check valve *9* to open it against boiler pressure and force water into the boiler. Although this is a self-evident truth it is not always understood and appreciated.

For illustration of this point, the mistake is sometimes made of assuming that pressure is equal in all parts of a heating system, but this may not be realized in practice. If

the pipe *3* is too small for the required service, less than boiler pressure will be secured in *5*, hence water will not run out of *6* unless it is high enough above the water level in the boiler to compensate for the difference in pressure.

In giving the history of this invention Mr. Blessing tells of one case in the early part of his experience, where his steam loop failed to work and the cause was not plain until he discovered that pressure in the receiver was 8 pounds less than boiler pressure, while the receiver was only 10 feet above the water line. In order to work well it must be 3 feet above it for each pound difference in pressure, making 24 feet in this case, for although each ⅔ foot in height of cold water is equal to one pound pressure, there must be more than this for water that is hot as it is lighter, also to overcome friction in the pipes and valves.

Inasmuch as *5* must be lengthened equally with *7* it appears as if one would balance the other and prevent gaining the necessary pressure at *9*. This would be the result were it not for the fact that the mixture of water and steam in *5* is much lighter, hence does not exert back pressure for each foot in height equal to the forward pressure exerted by *7* for an equal height.

The intelligent reader may wish to know what could cause failure to operate in a case that ever had worked well. A certain system may have given satisfaction with a few radiators, but the number may have been increased until the main steam pipe is no longer large enough to maintain the required pressure, hence the system fails to work. There is no limit to the number of radiators that can be used, provided the steam pipe is of ample size.

The validity of the patent granted for the steam loop as above described was contested in the courts, and the rather startling claim made that such an apparatus could not work as stated in the patent. This caused Mr. Blessing to have a working model made and brought into court, of which Fig. 3 is a very good representation.

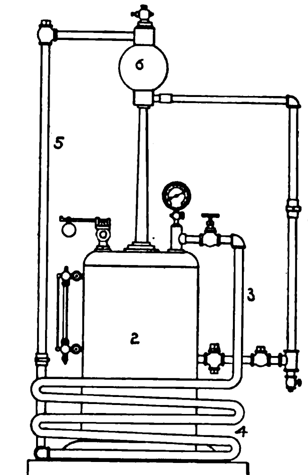


FIG. 3.

Heat from a gas jet was applied to the boiler *2*, and when pressure was raised to 5 pounds it was admitted to the pipe *3* and thence to the coil *4* where some of it was condensed, the resulting water mixed with steam then passed up through *5* into the receiver *6*, and as water settled to the bottom it passed out through *7* and returned to the boiler. In the original model there was a glass section in *3*, also in *7*, thus making it possible to see the steam and water as they circulated. Of course it was not possible to dispute the evidence so presented, but it seems strange that the contestants did not try the experiment on their own account before presenting the claim.

Fig. 4 illustrates an application of the steam loop to a steam engine, showing that its use is not confined to plants carrying low pressure for heating purposes. The boiler generates steam containing more or less moisture, to which is added water due to condensation of steam on its way through

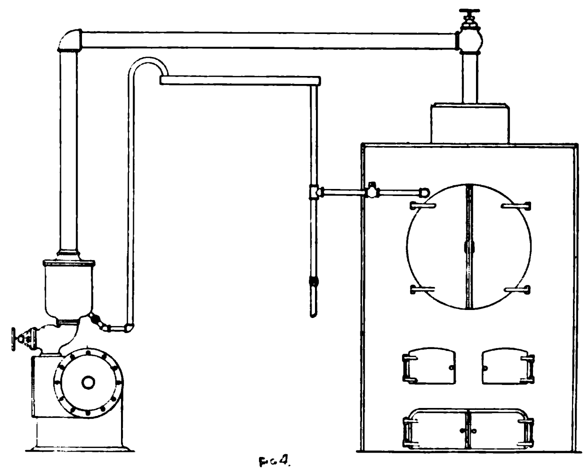


FIG. 4.

the main pipe. This is taken out by the separator just before it reaches the throttle valve, and the drip pipe from this separator terminates in a steam loop as shown.

The receiver is not high above the water level, but it will work well provided the main steam pipe is large enough to fully answer the purpose for which it was installed. In this connection it may be well to note that a steam pipe should not only be large enongh to convey sufficient steam to give motion to the engine, but also be of ample size to maintain very nearly boiler pressure in the steam chest, as the difference should never be more than 5 pounds.

One great advantage of the steam loop is that it has no moving parts to become disabled and wear out. It will always work well if the foregoing conditions are fully complied with.

EXPLOSION OF STOVE BLACKING.

The Boston *Post* tells of an explosion of stove blacking wherein six people were burned. One woman was burned so severely that she will die.

The stove polish was a liquid polish and was not supposed to be explosive or inflammable. The woman was cleaning the stove when the stove polish exploded and the flames caught the clothing of the woman.

She was one mass of flames as she ran into the street. A man who was passing hastened to her assistance but was himself badly burned in trying to extinguish the flames. Another man and a fireman pulled off their coats and tried to smother the flames, but their efforts were too late and they themselves were burned in the attempt.

The police ambulance hastened the woman to the City Hospital, where the physicians pronounced the woman burned beyond recovery.

OUR THANKS

To the Members of the Superintendents of Bridges and Buildings Association.

The Association of Superintendents of Bridges and Buildings held their convention in Boston in October, and we desire to extend our sincere thanks to the many members of that association who spoke so kindly and even enthusiastically of Dixon's Silica-Graphite Paint.

We thank them not only for what they said concerning the high qualities and durability of the paint, as proved in the thorough tests made, but also for their promises of future business.

The Dixon Company has made a success in producing a protective paint of one quality only—*One Quality and Four Colors* has been the slogan of the Dixon salesmen.

Strong pressure has been brought to bear from time to time by the constructors and even by our own friends to manufacture a paint of second quality. The argument has been that there are many times when a cheaper paint must be used and that the price of the Dixon Silica-Graphite Paint was too high. On our side we have claimed that no paint can be too good and no price is too high if the paint possesses the corresponding durability.

In other words, no paint should be cheapened by an inferior oil or by something that is not oil, or by inferior pigments of any kind.

The Dixon Company has claimed, and the proof is easily demonstrated, that only the very best seasoned linseed oil is used and that indestructible pigment, Dixon's Flake Graphite and Flake Silica.

That the position of the Dixon Company is correct in the matter of protective paint is shown from the following short extract of remarks made at the convention of the Superintendents of Bridges and Buildings:

"I have a number of bridges on my division painted with Dixon's Natural Color. I recommend it for the protection of steel bridges and for such work."

"You may rest assured I recommend the use of Dixon's Silica-Graphite Paint for the protection of bridges."

"We are using Dixon's Dark Red for the priming coat and Dixon's Natural Color for the finishing coat for bridges on our road. We have recently ordered seven barrels of Dixon's Silica-Graphite Paint for this work."

"Within the past year we have adopted Dixon's Silica-Graphite Paint for the protection of steel and iron work and indications point to our using large quantities during the coming year."

"I do not care to have my name mentioned, but you may be assured that I do not hesitate to recommend Dixon's Silica-Graphite Paint for the protection of steel bridges."

"I have recommended Dixon's Silica-Graphite Paint, Natural Color, on some of the largest bridges on my division."

"I have not used Dixon's Silica-Graphite Paint, but I have heard so many good reports that I shall experiment with some of it during the coming year."

"I have used Dixon's Natural Color on many of the bridges in my division and shall continue to recommend the use of it, whenever possible, for the protection of steel."

"We have never used Dixon's Silica-Graphite Paint, but are going to give it a trial."

"Dixon's Silica-Graphite Paint is all right. We ordered five barrels of it last week."

"I have used Dixon's Silica-Graphite Paint for a long time and I consider it the best on the market and am always satisfied with it."

"I use Dixon's Silica-Graphite Paint on smokestacks and other ironwork and it is all right."

"I have requested my foreman painter to use Dixon's Silica-Graphite Paint on all large work."

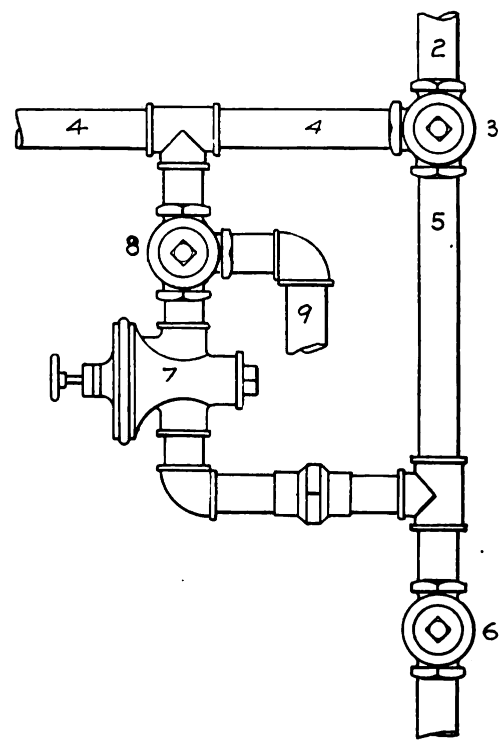
We could easily make many similar quotations, but we feel that the above quotations will show the drift of opinion of those who give the matter of protective paint careful study and consideration.

MORE ABOUT A STEAM TRAP.

In the September issue Fig. 22 illustrated a steam trap which works by expansion and contraction. It is shown with inlet at the top and outlet at the bottom, thus bringing the water of condensation in contact with the operating disc.

This is proper for use on radiators or any other place where it is desired to hold the water until it has given up some of its heat, or, in other words, until its temperature is lowered. Where it is desired to dispose of the water of condensation as fast as it accumulates, regardless of its temperature, the connections should be reversed, thus discharging at the top.

The illustration shows one of these traps connected to a steam heating system the drip from which is shown at *2*. A three-way cock is illustrated at *3* which may be turned to discharge from *2* into *4*, thus allowing water to go directly to a receiver, or it can be made to discharge from *2* into *5* and if the cock *6* is closed this water will go to the trap *Z*.



From this it is discharged through a three-way cock *8*, either going into *4* and from thence to a receiver, or it may be turned to discharge into *9*, which carries it to the sewer. If the cock *6* is open, the water will go directly to the sewer without going through the trap.—W. H. WAKEMAN.

SIXTEENTH ANNUAL CONVENTION OF ASSOCIATION OF RAILWAY SUPERINTENDENTS OF BRIDGES AND BUILDINGS IN BOSTON.

The sixteenth Annual Convention of Railway Superintendents of Bridges and Buildings, which took place at the New American Hotel, Boston, Mass., proved the largest and one of the pleasantest ever held by this energetic organization.

President J. B. Sheldon, Supervisor B. & B., of the N. Y., N. H. & H. R. R., presided and introduced President Lucius Tuttle of the Boston & Maine R. R., who gave the address of welcome. In a strong inspiring speech, a speech that reached the heart of every railroad man present, Mr. Tuttle gave the delegates a warm welcome to the city. Said he: "Nothing does more for transportation methods and service than conventions like this, where practical men meet together to profit by one another's ideas. It is one of the fine things of the present time that the moment a man of intelligence learns something new, and something of value, he wants to give it out, to distribute his idea among his fellows, where it will do good. This going about for business meetings is worth four-fold the time and money which it costs. Each of us, left to himself, is apt to get an idea that his own way is the only way. There never was an idea so illusive as this. Railway managers in general look on this form of convention as a foundation for better service, better growth, in every way. We note as a result of such gatherings an improvement in all branches, more uniformity in ideas and practices even in the remote sections."

The prolonged applause which followed Mr. Tuttle's address showed keen appreciation. Mr. Joseph H. Cummin of the Long Island R. R. responded, his eloquence and well chosen words showing the material of which the association is composed.

Members of the Association of Railway Superintendents of Bridges & Buildings are workers, a fact that is strongly emphasized by the proceedings they publish annually. With these men it is "business before pleasure," and this plan is always adhered to at their annual meetings.

After attending these gatherings one is strongly impressed with the fact that the members are not meeting for a holiday. They are there for work—good solid work—the exchanging of ideas formulated during a strenuous year in the railroad world. It is through this well defined channel that railroads who are fortunate enough to have members attending these conventions receive valuable information. The Association is growing rapidly, there being a membership of three hundred and twelve exclusive of thirty five new names this year.

Many of these railroad men use Dixon's Silica-Graphite Paint for the protection of steel bridges, and it was gratifying to the representatives of the Joseph Dixon Crucible Co. to hear the unsolicited words of praise for this well known product.

The Dixon souvenirs included souvenir blotters illustrating Bunker Hill Monument, booklets illustrating historical points of interest in Boston and Dixon's celebrated American Graphite Pencils were exceedingly popular.

The social side of the convention proved delightful. It was in charge of an efficient entertainment committee consisting of B. F. Pickering, Chairman, J. P. Snow and George T. Sampson. Mr. H. A. Nealley, manager Dixon's Boston office, 101 Tremont street, has attended the conventions of the Association of Railway Superintendents of Bridges and Buildings for some years, and has a large acquaintance with the members, with whom he is meritoriously popular. Boston being Mr. Nealley's home, he was very active in pointing out all historical places that would be of special interest to the visitors. Mr. E. M. Taussig, of Dixon's Paint Department, Jersey City, ably assisted in the entertainment of the members and their guests.

The entertainment included a trip for the ladies to local points of historic interest in Boston, automobile trip over Boston and the park system, visit to the Food Fair at Mechanics Hall, where seats were reserved for Sousa's Band concert, trolley trip over Paul Revere's route to Lexington, afternoon tea at Harvard University, Cambridge, card party and musical entertainment at the American House, and trips over the Boston & Maine Terminal Station and South Terminal Station. On Wednesday evening, Professor George F. Swain, of the Mass. Institute of Technology, gave an entertaining after dinner speech which was much enjoyed. Appropriate remarks were also made by Professor Johnson, of Harvard University. Friday was devoted to a trip by special train over the Boston & Maine R. R. The largest woolen mill in the world was visited at Lawrence, and the world's largest cotton mill at Manchester. The party was then conveyed to the Portsmouth Navy Yard, where there was much of interest, including the room in which the Peace Congress met. Before returning to Boston an enjoyable hour was passed at York Beach, Maine.

The following officers were elected for the ensuing year: President, J. H. Markley, Toledo, Peoria & Western; First Vice-President, R. H. Reid, Lake Shore; Second Vice-President, J. P. Canty, Boston & Maine; Third Vice-President, H. Rettinghouse, Wisconsin Central; Fourth Vice-President, F. E. Schall, Lehigh Valley; Secretary, S. F. Patterson, Boston & Maine; Treasurer, C. P. Austin, Boston & Maine; Executive Committee: W. O. Eggleston, Erie; H. H. Eggleston, Chicago & Alton; A. E. Killam, Intercolonial; J. S. Lemond, Southern; C. W. Richey, Pennsylvania; and B. J. Sweatt, Chicago & Northwestern.

It was voted to hold the 1907 convention at Salt Lake City, with Milwaukee as second choice, in case the Transportation Committee find the latter place more desirable.

GRAPHITE IN WINTER.

As an Aid to Better Lubrication.

Almost any bearing that requires oil in it will work harder in winter than in summer, as the oil is bound to be more viscous when cold than when warm. It is for this reason that experienced men who have tried it suggest that a possible solution of difficulties in lubrication may be found in the use of flake graphite along with some thin mineral oil. The lubrication will be as good, if not better, and the drag and slowness will disappear.

Dixon's graphite publications sent free upon request.

"THROUGH 'FRISCO'S FURNACE."

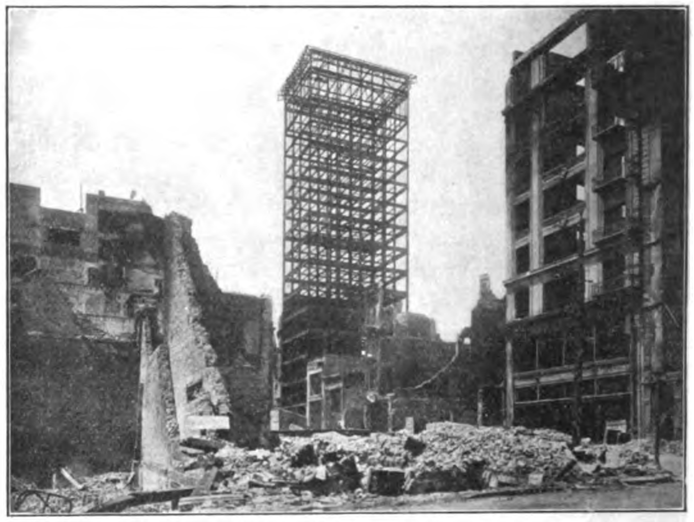
The above is the striking title of one of the most remarkable advertising booklets we have seen for a long time. It emanates from the Joseph Dixon Crucible Company, of Jersey City, U. S. A., and shows by a series of excellent photographic illustrations the effects of the earthquake and fire of April last on some of the important buildings of San Francisco. These illustrations demonstrate again what has more than once been pointed out, that the modern steel-framed buildings, even those of the greatest height, stood erect in the midst of earthquake and fire while buildings in older styles of construction were hurled to destruction. It is not, however, primarily to exhibit the advantages of steel construction that the booklet is compiled. It is pointed out that in the many articles that have been published on the disaster the question of protective coatings for preserving the maximum strength of steel frames has not been given the attention its importance deserves. Observing this fact, and having an intimate knowledge of the weakening action of rust on steel, the publishers of this pamphlet, who are the proprietors of Dixon's Silica-Graphite Paint, have had examinations made to determine the condition of those specimens of their paint that were used on the steel work of San Francisco buildings.

Engineers and architects fully appreciate the necessity of a true protective paint on the steel before it is enclosed by building materials. In selecting a protective paint it has always been realized that while it has been possible to judge how the various paints preserve the visible portions of steel structures, it was, of course, impossible to decide regarding

paints covered with building materials, and the vital question was: "Does the paint covered with building materials protect the steel?"

Steel work that is enclosed is subjected to moisture and alkalis, to a certain degree, in nearly all buildings, but the basement and the first two stories are also usually subjected to corrosive agencies in the form of gases, produced by the decomposition of the so-called "made ground," and these gases, owing to their high rate of diffusibility, penetrate to every portion of these floors. This condition was particularly true of San Francisco, as many of the high steel frame buildings were on "made ground," and the lower stories of the steel work were consequently subjected to this corrosive action.

The extraordinary conditions at San Francisco afforded a unique test of the value of the preservative paint employed on the steelwork. The granite, brick, and fireproof facings of the buildings were, in many cases, wholly or partially removed by the earthquakes, dynamiting and fire, leaving the steel exposed to view, and showing the condition of the preservative paint. A number of striking testimonies are given from independent sources, and illustrated by photographs, showing that Dixon's Silica-Graphite Paint proved very efficacious in preserving steelwork enclosed by building materials.



We reproduce on a smaller scale one of the illustrations in the book, showing the steel skeleton of the Whittell building, standing erect, and almost uninjured, amidst the desolation around. This fifteen-story building had been completely erected, but the steelwork had not been enclosed when the earthquakes and fire occurred. None of the fireproof floors was in place, so that this is the most striking example of the rigidity and stability of the high steel-frame building. A thin coat of Dixon's Silica-Graphite Paint had been applied to the entire steelwork, which had not received a second coat when the fire occurred. On the lower floors the one coat of paint was destroyed by the fire, but from the sixth floor up the paint was found to be in good condition. The other illustration which we reproduce, shows in graphic form how very much more destructive the San Francisco calamity has proved than any of the conflagrations which have devastated other American cities.

—*The Illustrated Carpenter and Builder*, London, England.

6,000 MILES BY TROLLEY.

"During the past season a number of long distance trolley trippers have developed, but the champion of them all is probably William Cahoone Greene, of Norwell, Mass.," says the *Tri-State Tourist*. "It is nothing new for Mr. Greene to cover thousands of miles by trolley in the course of a season, and this year he expects to beat all records. Before the cold weather sets in and prevents the fullest enjoyment of these trips, he will have covered about six thousand miles this year."

DIXON'S "A. B. & T. V." GREASE.

Dixon's Air Brake and Triple Valve Grease has met with great favor with both steam railway and trolley railway officials. Especially is it approved by operating engineers. The two letters herewith written by an enthusiastic engineer voice the sentiments of many.

September 18, 1905.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Gentlemen:—I received your sample of Triple Valve Grease and the next day applied it to the air brake and triple valves of my locomotive. It has worked like a charm and is the best thing I have ever seen, very much better than the vaseline previously used. I intend to buy it for my own benefit if the company does not furnish it, for I do not intend to be without it. It is a great pleasure to have a good working air brake and I certainly have that now. I have been a locomotive engineer in freight and passenger service for nearly seventeen years, but have never seen anything to equal Dixon's Graphite Air Brake and Triple Valve Grease. I mean to apply it to the three cars on my drive without saying anything about it and will then ask the conductor if he can detect any difference.

You may use my name anywhere, and I will vouch for the truth of the above statements.

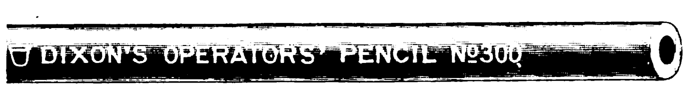
Yours respectfully,
(Signed) EVERETT J. ENOS, Engr.,
N. Y., N. H. & H. R. R.,
Box 78, Hope, R. I.

HOPE, R. I., September 30, 1906.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Gentlemen:—I have my brake valve and triples lubricated with Dixon's Air Brake and Triple Valve Grease. I would not know what to do without it. I have an 8-inch pump that has run fifteen months without taking off the head nor had any repairs to it except two discharge valves in the lower, and they broke, and it does the work for three to five cars —whatever I happen to have. It is the best pump I ever saw—not a groan out of it; simply a little oil and graphite. I think it is money in a company's pocket. I have an engine out of the shop most fifteen months and she has not cost this road five dollars for repairs, as I take good care of her, use plenty of oil and I think lots of graphite with it, but most men nowadays let everything go rather than buy a few cents worth of graphite; but I do it for my own interest. They can look up my engine record any time, and you ask them at New Haven. They will give it to you if you ask them and give the number 1918.

Yours truly,
(Signed) EVERETT J. ENOS.



A pencil well adapted to all kinds of rapid work.

Productions of the Dixon Crucible Co.

Dixon's Black-lead Crucibles and Retorts, all sizes and for all purposes. Bowls, Dippers, Stirrers, Stoppers, Nozzles, Muffles, Sleeves, etc.

Dixon's Brazing Crucibles, made in several shapes for dip-brazing.

Dixon's Graphite Boxes and Covers, for baking carbons and filaments for electric lighting.

Dixon's Fine Office and Drawing Pencils, unequaled for smooth, tough leads and uniformity of grading.

Dixon's Colored Crayons, in wood or solid. For schools, railroads, editors or factory.

Dixon's Lumber Leads, black or colors; for green or dry lumber.

Dixon's Metal Workers' Crayons.

Dixon's Felt Erasive Rubber, for erasing pencil marks, typewriter work or ink.

Dixon's Carburet of Iron Stove Polish, the old reliable; in cake.

Dixon's Pure Flake Lubricating Graphite, a solid lubricant for all frictional surfaces.

Dixon's Special Graphite No. 635, for lubricating cylinders of gas engines and all close or delicate mechanical parts.

Dixon's Electrotyping Graphite, used by the majority of practical electrotypers of this country.

Dixon's Hatter's Lead, for coloring hat bodies.

Dixon's Plumbago for Shot Polishing.

Dixon's Plumbago for Powder Glazing.

Dixon's Plumbago Foundry Facings.

Dixon's Yacht Plumbago, for lubricating and smoothing bottoms of yachts.

Dixon's Graphite Waterproof Grease, for gears, wire ropes, hoisting chains and general machinery.

Dixon's Graphite Axle Grease, for trucks, wagons, carriages.

Dixon's Graphited Wood Grease, for use on trolley car gears which are enclosed in a gear case.

Dixon's Graphited Oil, for use in all places where the use of a gear grease is impracticable.

Dixon's Graphite Cup Greases, for use in cups or open bearings, on spindles, shafting, etc.

Dixon's Oiled Graphite,

Dixon's Lubricating Compound No. 688, for enclosed gears of electric automobiles.

Dixon's Silica-Graphite Paint, for metal or wood-work, roofs, bridges, telegraph and trolley poles, smoke-stacks, boiler fronts, and iron construction work.

Dixon's Graphite Pipe-Joint Compound, for steam, gas and water piping, smearing gaskets and flanges.

Dixon's Automobile and Bicycle Lubricants.

Dixon's Graphitoleo, for lubricating bicycle chains, sprockets, pivots and pins; gun locks, and for general use.

Dixon's Commutator Graphite, will glaze commutator with the finish so much desired by electrical engineers.

Dixon's Graphite for Type Setting Machines.

Dixon's Graphite for Talking Machines.

Dixon's Motor Chain Compound, for transmission chains.

Dixon's Crucible Clay and Graphite Mixture, for lining and repairing fire boxes.

Dixon's Stove Cement, for repairing stove or range lining.

Dixon's Traction Belt Dressing, for leather belts.

Dixon's Solid Belt Dressing, convenient for those who prefer a solid dressing.

Dixon's Graphite Resistance Rods, from one-eighth to one inch diameter; any resistance required.

Dixon's Graphite Brushes, for motors, dynamos and generators.

Dixon's Graphite Products for Electricians.

Special circulars with detailed information sent on request.

DIXON'S GRAPHITE PRODUCTIONS
FOR STREET RAILWAYS.
Also Special Illustrations and Descriptive Articles on the Columbus Convention, American Street and Interurban Railway Association.

A REPORT ON DIXON'S AIR BRAKE AND TRIPLE VALVE GREASE.

This Report Is Well Worth the Careful Reading of Every Railway Official Who Has Charge or Supervision of Air Brake Systems.

It is the experience of the Dixon Company that all railway officials have a strong dislike for publicity or in having their reports or names published in any way, shape or form.

For this reason the Dixon Company has always kept inviolate the names of railroad officials who have from time to time very favorably reported on Dixon's graphite products. The Dixon Company has believed that its own word and integrity is sufficient warrant that the reports are made strictly in accordance with the facts given by the railroad experts, and are in no sense doctored or twisted or changed by the Dixon Company.

In the first place, the Dixon Crucible Company has, during the past two years, been offering to the railroad companies an air brake and triple valve grease that seems to be possessed of such merits as would make it superior to anything else in the market for lubricating triple valves and for general use in air brake systems.

In this particular case to which we now make reference the well-known —— compound was used in one case and Dixon's Air Brake and Triple Valve Grease in the other.

On taking down the brake cylinders and examining the pistons it was found that after ten months' service the piston in the brake cylinder was well lubricated and that the leather packing was in good condition, and upon examination of the triple valve the triple piston ring was well lubricated and in good shape as well as the triple slide valve.

In the other case where the —— compound was used, examination showed that the packing ring of the piston had become dry and that it would be necessary to grease it again; also the triple was not in as good condition as still another one which was lubricated with red oil.

These tests for durability were acknowledged in favor of Dixon's Air Brake and Triple Valve Grease. The railway expert was of the opinion that for a time there was more danger of ring leakage with Dixon's Triple Valve Grease than there would be with red oil, but he was also of the opinion that, as time went on, the ring leakage would cease and when the pores were well filled with graphite that the ring leakage would probably cease—in other words, that when the graphite triple valve grease was first applied, the ring leakage was much more than when the brake had been applied a dozen or fifteen times.

The railway expert was also of the opinion that even after ten months' service there would really have been no necessity for further lubrication for at least six months more, in the case where the Dixon Air Brake and Triple Valve Grease was used, while in the other case immediate lubrication was absolutely necessary.

PHILADELPHIA'S MAGNIFICENT CITY HALL.

IN KEEPING WITH GOOD ARCHITECTURAL EFFECTS, THE IRON TROLLEY POLES OF THE PHILADELPHIA RAPID TRANSIT CO., ON ALL STREETS SURROUNDING THE CITY HALL, PHILADELPHIA, ARE ORNAMENTED AND PROTECTED WITH DIXON'S SILICA-GRAPHITE PAINT, OLIVE GREEN.

WHO'S IN AND WHO'S OUT.

Conductor—I want to punch your ticket.

Farmer Ragweed—Punch the boy. He's swallowed the ticket.

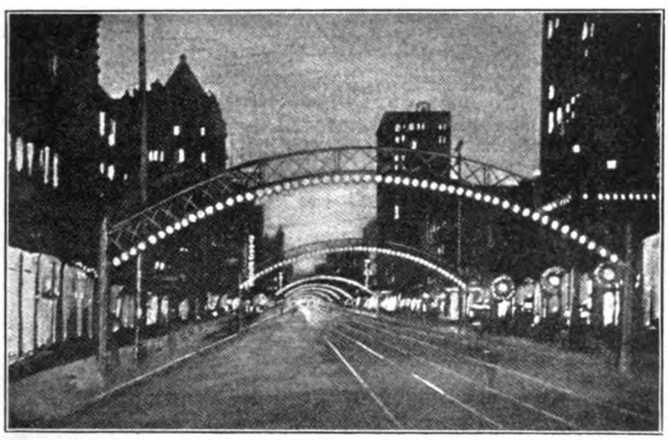
—*The Keystone Traveler.*

COLUMBUS CONVENTION—AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION. *Street Railway Journal.*

Wise men of the east, south, north and west selected the City of Columbus for the Twenty-fifth Annual Convention of the American Street & Interurban Railway Association.

The civic pride of the citizens of Columbus produced comforts, conveniences and facilities for effective convention work that have never been equalled in the history of the allied association of street railway officials.

The illustration made from a photograph taken at the time of the Ohio State Fair, shows three of the seven large buildings at the Ohio State Fair Grounds at Columbus, Ohio, which were devoted to the exhibits of the American Street and Interurban Railway Manufacturers' Association, and to the meetings of the American Street & Interurban Railway Association.



Electric Railway Review.

MILES OF RED, WHITE AND BLUE LIGHTED ARCHES.
HIGH STREET, COLUMBUS, OHIO, IN HONOR
AMERICAN STREET AND INTERURBAN RAILWAY CONVENTION.

The buildings were admirably suited for Street Railway Appliance exhibits. Railroad trackage to the buildings and many competitive express companies allowed all of the exhibits being housed and made ready before the opening of the Convention on the morning of October 15th.

Over two hundred of the most prominent manufacturers of street railway appliances in the world, had well arranged exhibits of their products. The booths were unusually large, with aisle and space arrangements of a character to permit the best possible examination of the appliances in the various buildings, which were connected by covered passage-ways. The booths were decorated in various pleasing ways, and each showed an individuality of color effect and arrangement of products that made the general appliance exhibit the best that has ever been shown.

Street railway systems from all parts of the United States and some foreign countries, were each represented by one to fifteen of their executive officers and officials in direct control of the operation of the Street and Interurban Lines.

These important street railway officials impressed exhibitors and visitors by the business-like attitude with which they fully investigated every feature of the appliances adapted to the respective departments of their roads.

The affiliated street railway associations are made up of a particularly progressive, intelligent body of men, devoting their best thoughts and energy to the rapid transit problem; the safe and quick transportation of the rapidly increasing population of the cities, towns and suburban sections.

The importance and magnitude of the American Street and Interurban Railway Conventions can be understood by the explanation that special trains were run to the Columbus Convention from eastern and western cities for the accommodation of street railway officials and exhibitors, with special rates of fares.

The Bell Telephone Company provided long distance service to any part of the United States from 6 P. M. to 9. P. M., free of cost to street railway officials and exhibitors.

Elegant souvenir badges of the various associations, entitled the wearer to free street car transportation on lines of the Columbus Railway and Light Company and all Interurban Railways having a terminus at Columbus.

The badges also served to admit the wearers to the various entertainments provided for the members, exhibitors and guests, which included the Assembly Meeting Monday night at the Southern Hotel; the reception and dance at the Memorial Building, Tuesday night, and the Opera "Fantana," at the Shubert Theatre, or "She Stoops To Conquer"—Wm. H. Crane-Ellis Jeffrey's combination at the Southern Theatre Wednesday evening: the Song Recital at the Arlington Country Club, Thursday afternoon, and the Annual Amateur Vaudeville performance at the Southern Theater, Friday evening. The Annual Banquet of the American Street and Interurban Railway Association was held Thursday evening, and was largely attended by men of national reputation.

... today.

Phenomenal Attendance.

The general attendance has been phenomenal. It was estimated Wednesday afternoon that more than 10,000 people had passed through the main entrance to the manufactures building. This figure was placed for the morning and afternoon. Two thousand additional persons who were held by business during the afternoon were thought to have attended at night.

There are always, of course, some exhibits which surpass on account of their respective features. It is justly conceded that the Westinghouse firm has the largest exhibit, with the heaviest tonnage of machinery; that the Blake Signal and Manufacturing company has the most complete outlay, with its dispatchers' system in full working order; that the William Wharton, jr, & Company and then the Electric Service Supply company have the handsomest booths, but the most unique of any is the Joseph Dixon Crucible company's exhibit in the Horticultural building.

Mirrors there are to make you look long-drawn-out and angular; another shortens you until you have the appearance of having been held under a pile driver in action. The design is that of the manager of the exhibit, C. H. Spotts. Mr. Spotts had a great deal to say concerning the growth of the pencil industry, aside from the proposition of paint, which is receiving a great deal of attention at the hands of the company.

The Uses of Graphite.

"There are innumerable uses to which graphite is being put," he said, "but the one of most universal importance is in the 'lead' pencil. Of course the 'lead' is no more lead than any other graphite article. It is merely graphite mixed with clay to give it hardness. We have tried to reduce this mixing process to a science and the way we have succeeded can well be imagined, for last year we sold over 100,000,000 pencils of 1100 kinds. The only good wood from which to make pencils is cedar and the best of that comes from Florida."

The big paint can which contains the fun making mirrors was specially constructed and catches the fancy of all who enter the building. It is 11 feet by 20 feet by six feet in diameter. If filled it would hold 1600 gallons of paint, enough to cover 800,000 square feet of metallic surface

Flowers are forming a great source of advertisement and pleasure to the recipients. The Buckeye Engine company yesterday gave away over 4000 of them to the visitors and delegates ... day is the outlay ... enirs ...

The Ohio Sun.

The acme of exhibitor's art is catching and holding the attention of a visitor, but how much greater is he who holds the visitor's reflection is a fair guess. The art of Charles H. Spotts, of the Dixon Crucible Company, does both. Happy may be the man who has the gift of seeing himself as others see him, but he may well be thankful that no one sees him as he sees himself in the Dixon exhibit space. When Hamlet said to his dad's ghost, "Thou comest to me in questionable shape," he had not seen Dixon's exhibit or he would not have questioned anything he saw. As for the rest, it is hardly necessary to mention the well known Dixon crucible products. They have added lustre to other towns than Jersey City. From silica-graphite paint to plumbago crucibles and American graphite pencils to commutator compounds extremes meet.

* * *

The James G. Wilson Manufacturing Company has, in Building No. 6, its newest device in ...

The Daily Edition Electrical Railway Review.

MANY PASS THROUGH HUGE PAINT CAN

One of the Striking Features of Paint Company's Exhibit.

A huge paint can in orange and silver leaf, large enough for a half dozen persons to stand inside at one time, is one of the unique exhibits of the Joseph Dixon Crucible company, makers of the Dixon pencils, besides plumbago crucibles, graphite curb grease, graphite gear grease and lubricants and the well-known silica graphite paints. Hundreds of people passed through the big can yesterday and were amused by the ludicrous caricatures of themselves made by the twisted mirrors on the inside. The can is 11 feet high, including the handle, and six feet in diameter. It would hold, if filled, 1600 gallons of paint, and the contents would cover nicely 800,000 square feet of metal surface.

It is the idea of C. H. Spotts, manager of the paint department of the Dixon firm. The rest of the exhibit space of the company is prettily decorated. Last year the Dixon people sold 85,000,000 pencils alone. Others connected with the exhibit here are D. M. Howe, manager of the Pittsburg department; L. H. Snyder, mechanical engineer, and J. H. Braddon of Chicago, in charge of the department of lubricants.

Roses for the Women.

Roses for the wo... persons who wore ... way freely ...

The Ohio State Journal

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posts and sw... ...

The editors of The Electric Railway Review are not accustomed to the use of pencils so hard as the name "Cyprus Bronze" would appear to indicate. They are more familiar with the "feel" of Dixon's "Sketching Crayon," which, while it touches lightly, leaves a mark impossible of erasure. Yesterday, however, they tried a new brand bearing the name first mentioned. The name is somewhat confusing as other of the hexagonal faces of the pencil bear the inscriptions "Motor & Truck Bearings and Brass Castings," and "Brady Brass Company, Jersey City, N. J." Maybe "Cyprus Bronze" is not the name of the pencil, after all, but it works all right, whatever be its name That's the way with the man who gave us the pencils. "Whazher mazzer wizh Dan-" "He's all-write!"

The Ohio Sun publish... on yesterday morning an... ...ith Hon. W. ...

The Daily Edition Electrical Railway Review.

DIXON'S GRAPHITE CURVE GREASE.

The most desirable lubricant for the curved tracks of street railways is a grease which will be impervious to all climatic changes, one that is easily applied, reasonable in price and is lasting. Dixon's Curve Grease we believe is the only one which answers these hard specifications.

The first cost may be a little more than some others, but due to the graphite used it is much more economical than any other that can be used and the cost of applying is so small that it easily becomes the most economical grease on the market and will outlast any other.

A typical case is in the subway of one of our large Eastern cities, where after experimenting with many curve greases it was found that no other would stand but Dixon's on account of the very damp heavy atmosphere. A great number of trains run, making it dangerous to keep applying an inferior grease which would last only a short time. This is one of the many cases that might be named.

DIXON'S GRAPHITE CUP GREASES FOR DOPE CUPS.

Dixon's Graphite Cup Greases possess all the advantages of any good Cup Grease with the additional one, that of Dixon's Ticonderoga Flake Graphite.

The use of Dixon's Graphite Box Grease prevents hot boxes and insures a long trip without having to stop for the journal to cool.

WHY FLAKE GRAPHITE?

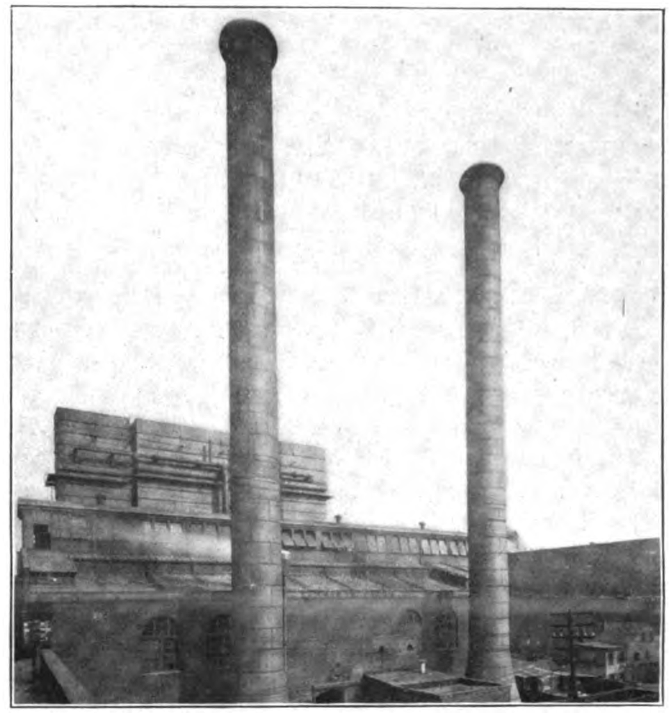
Users of graphite as a lubricant should bear in mind that the Dixon Company are importers as well as miners and are, therefore, in position to offer *any form of graphite* that may be desired.

The reason the Dixon Company offer and advocate the Ticonderoga flake *is because it is the best.* A thin, tough flake graphite, suitable for lubricating purposes, costs more to produce than the finest amorphous graphite which has been freely offered to the mechanical world for many years, and which, in fact, was the first form of graphite offered and used.

First came the amorphous graphite, then the Ceylon, and, finally and best of all, Dixon's Ticonderoga Flake Graphite.

Ticonderoga flake graphite is a tough, thin flake, and its impurity or ash is mica, which is not a bad lubricant itself.

The impurity or ash of amorphous graphite is a clay, which is not a lubricant, and which is the cause of amorphous graphite forming into balls or paste in engine cylinders.



PHILADELPHIA RAPID TRANSIT COMPANY'S POWER PLANT AND SMOKESTACKS,
33rd and Market Streets, Philadelphia. Pa.

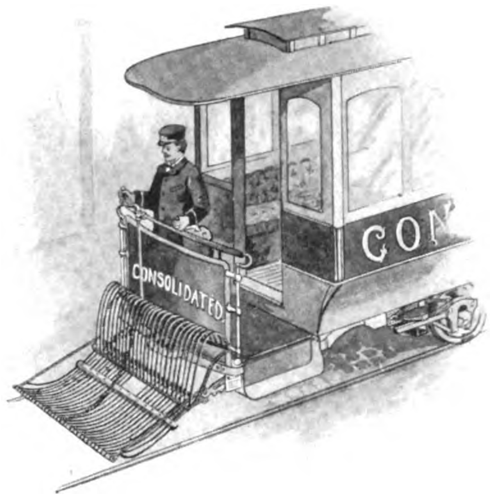
Stack protection is no longer a problem with the Philadelphia Rapid Transit Company. They used Dixon's Silica-Graphite Paint, *Black*, on the West Philadelphia stacks some five years ago, and have not had the annoyance and expense of repainting.

The most conspicuous part of power or manufacturing plants being the smokestacks, it is important that they present a well-kept appearance.

To protect iron stacks from rust, a paint must be used which will not be destroyed by the action of the high degree of heat obtaining in the stack, combined with continued exposure of the paint to varying atmospheric conditions.

The height and heat of smokestacks render their painting difficult and dangerous. The annoyance and expense of frequent repaintings can be avoided by the use of Dixon's Silica-Graphite Paint, Black, which is specially prepared for stack protection.

Street railway companies who are not users of Dixon's Black should arrange to have a stack coated with Dixon's Silica-Graphite Paint, Black, ready mixed for use, as manufactured by the Joseph Dixon Crucible Company. Time tests prove Dixon's *Black* the best.



ADVANTAGES OF DIXON'S TICONDEROGA FLAKE GRAPHITE IN STREET RAILWAY LUBRICATION.

The Function of Graphite as a Lubricant and the Reason why Flake Graphite is the Better Form. Special Graphite Lubricant for Trolley Cars.

It is a well known fact that a bearing surface cannot be made absolutely smooth no matter how long or how carefully it may be ground or polished. There will always exist what are known as microscopic irregularities in the metal.

The function of Dixon's Flake Graphite is to build up these minute irregularities with the best and roughest and most durable solid lubricant known.

Amorphous graphite or any other form of graphite, or finely powdered mica or talc would fill up such irregularities but will be washed out by the oil used in lubrication or by the condensation of steam, whereas the thin flakes of Dixon's Ticonderoga Graphite are impaled in the minute irregularities and are built up into a veneer-like coating of marvelous smoothness. In fact, the surfaces are built up so that there is a graphite-to-graphite bearing rather than a metal-to-metal-bearing, and seizing is made impossible.

Where Dixon's thin flake Ticonderoga Graphite has been used to build up and make smooth the wearing parts, it has been found possible to use a much thinner and even cheaper oil.

An ordinary flake of Dixon's Graphite can be broken up until it is so small that it requires a microscope to see it, yet it doesn't lose its flake formation. The flake formation can never be destroyed. For that reason Dixon's Special Graphite No. 635 and Dixon's No. 2 Graphite are just as much a flake graphite as the Standard No. 1 Flake, although the No. 635 and the No. 2 are much finer in pulverization.

The above is the fundamental principle of graphite lubrication by means of flake graphite, and it is because of the reputation made by Dixon's Flake Graphite that we now hear so much in the engineering world of graphite lubrication.

DIXON'S AIR BRAKE AND TRIPLE VALVE GREASE.

Probably the one graphite lubricant which stands out most prominent in street railway use is Dixon's Graphite Air Brake and Triple Valve Grease. The advantages of flake graphite as a lubricant for the air brake system were first demonstrated after a long period of careful tests by the well-known authority, Professor Goss, of Purdue University. The tests were made upon the testing rack of the master car builders at the Purdue University laboratory.

It was found that by using a certain amount of Dixon's celebrated Ticonderoga Flake Graphite in a finely powdered condition, known to the trade as Dixon's No. 635 Graphite, and a light petrolatum of very high grade, that the triple valves were very much more sensitive to the reduction of pressure, thus making the action of the brakes more delicate.

Later it was demonstrated that by its use there was no undesired quick action of the brake, with all its detrimental effects, such as flat wheels, bringing the cars to a dead stop upon grades, shaking up of passengers, which is both annoying and dangerous.

Careful and thorough demonstrations have shown that Dixon's Air Brake and Triple Valve Grease is superior to any other lubricant for the air brake system, as it can be used advantageously throughout the whole system and is unaffected by climatic conditions. It also prevents corrosion and rusting of delicate parts when used in a salt air country such as coast lines, and when used upon the engineer's valves it is surprising to find how much easier the valves work.

Dixon's Flake Graphite occupies an important place upon the hand-operated brake. A certain celebrated hand brake has a roller bearing (which is surrounded by an oil-tight case) working in Dixon's Graphite and oil.

DIXON'S PIPE-JOINT COMPOUND.

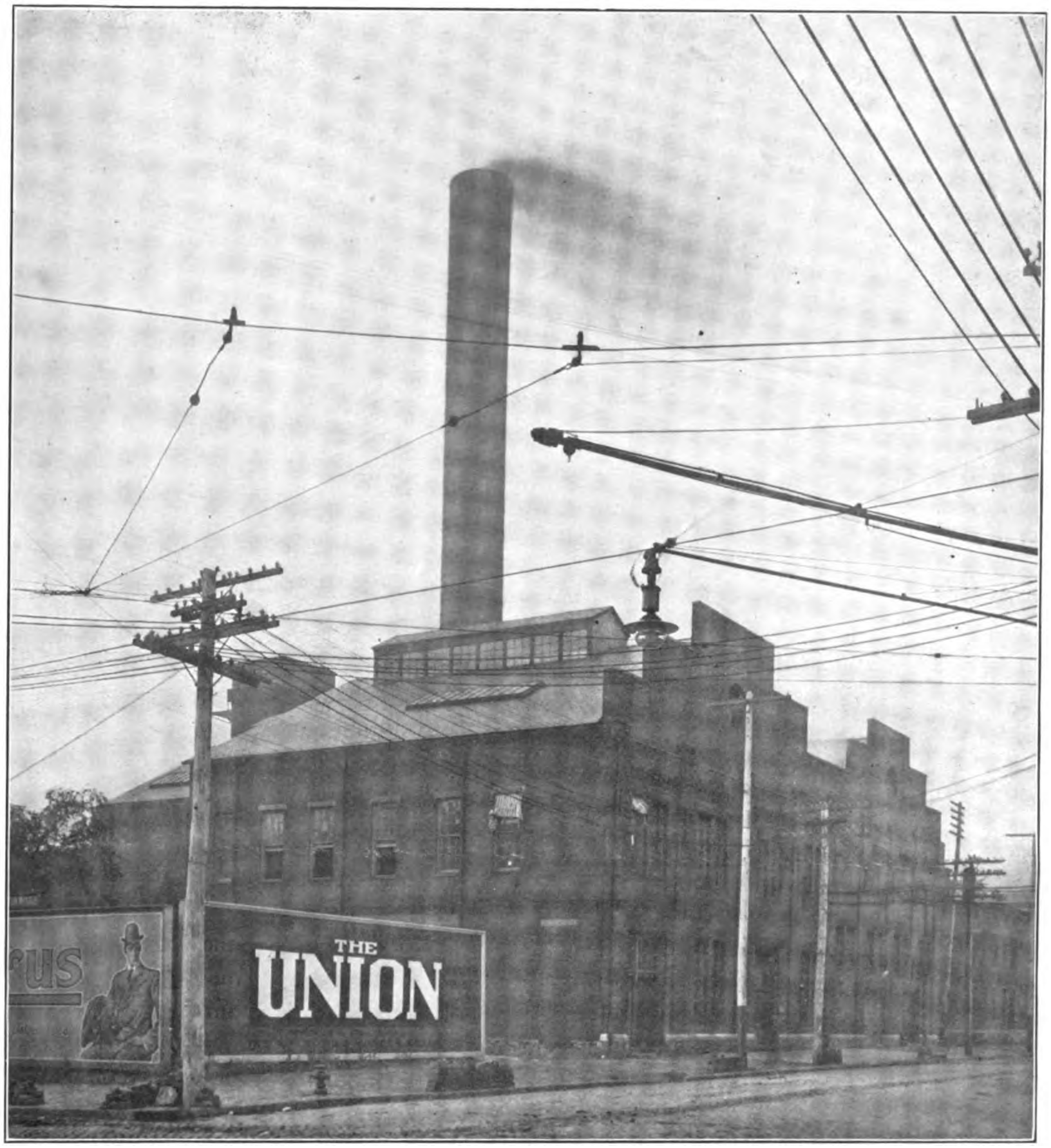
Dixon's Ticonderoga Graphite Pipe-Joint Compound is not, strictly speaking, a lubricant other than for pipe joints and

all threaded parts. The advantage to be gained by the use of this compound lies in the fact that it is possible to draw the joint up tighter than with lead or cement and with the added advantage that the parts can be taken apart at any time easily and quickly without breaking the connections or straining the tools.

WOULDN'T THAT WORRY YOU?

An excursionist to one of the parks reached by the Old Colony Street Railway Company's lines was about to walk into an eating-house for some lunch, when his eye caught the sign: "Dine here and you will never dine anywhere else." Then he side-stepped.—*Tri-State Tourist.*

Dixon's graphite publications sent free upon request.



GAY STREET STATION, COLUMBUS RAILWAY & LIGHT CO., COLUMBUS, OHIO.
"THE LIGHT THAT'S RIGHT."

white.

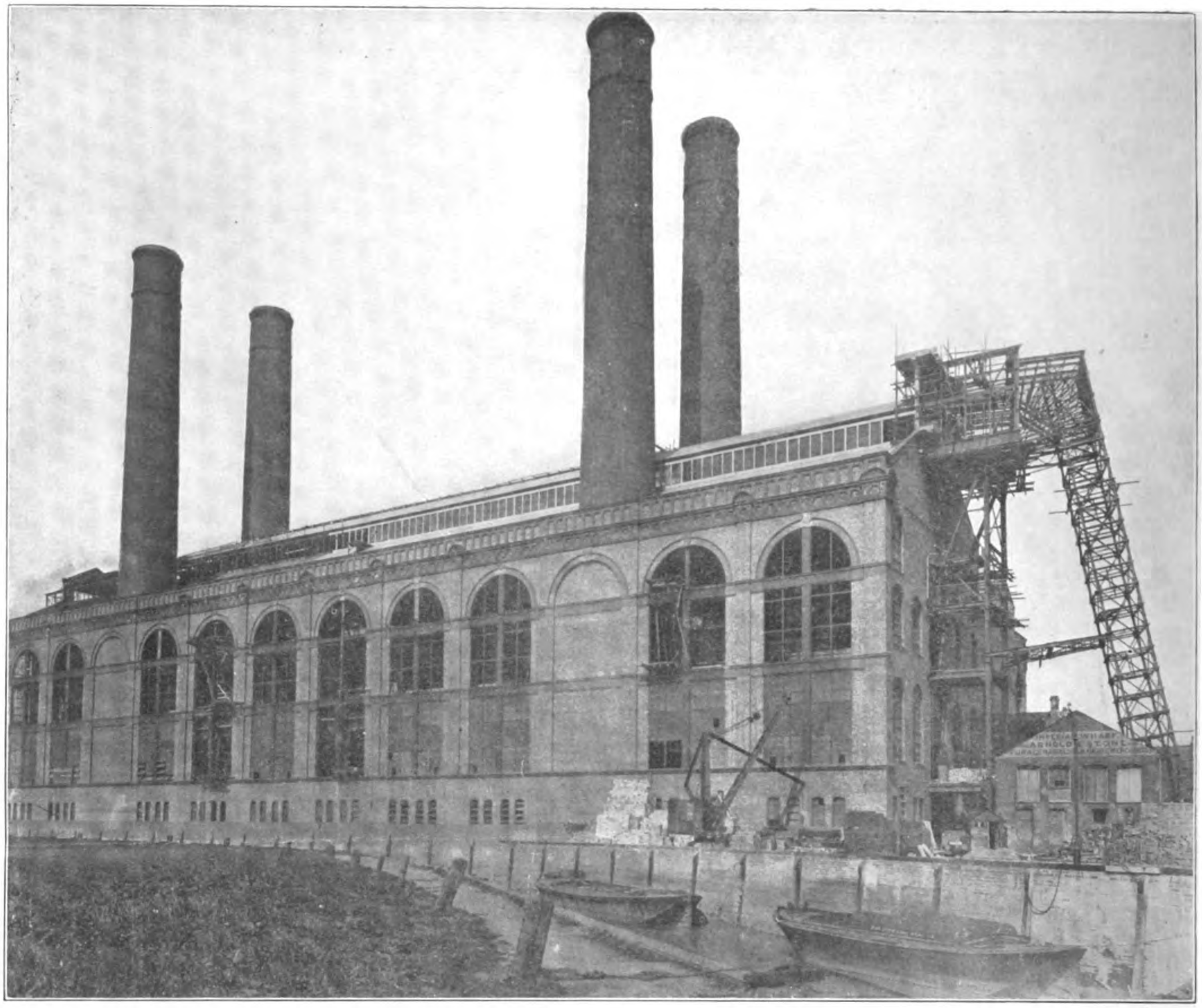
The Dixon Company has an international reputation because of its products. which are regarded by experts as superior to any product of a similar nature ever placed on the market.

Dixon's Silica Graphite Paint is the product with which the far greater majority of traction people come in contact with. It is the most durable paint ever manufactured. and its endurance against climatic action is such that it should rightly be styled the Gibraltar Paint. for it is as impervious to weather, almost, as Gibraltar. with her rocky inclines and war protections. is impregnable to any and all enemies.

The 124-foot smoke stack of the Columbus Edison Co., on East Gay street. in this city. was painted five years ago with Dixon's Silica-Graphite paint. and although at times the heat may be so intense within as to make it nearly red hot. and the low temperature without be sufficient to make the mercury in the thermometer hug the zero point. conditions that would render any ordinary paint of little use. the paint on this smoke stack is as good today as the day when it was put on. This stack is always unusually hot. and paint on it must. of necessity. be able to stand big degrees of heat.

Silica-Graphite Paint is also used to preserve steel trolley poles. trucks. iron roofs, water towers, etc. It was the first graphite paint ever manufactured

Ohio State Journal.



THE CHELSEA GENERATING STATION OF THE UNDERGROUND ELECTRIC RAILWAYS CO., LTD., LONDON, ENGLAND.
James R. Chapman, Chief Engineer. Mayoh & Haley, Building Contractors.
This view is taken from the river Thames and shows the Chelsea Creek. On the right of the power-house is the coal elevator leading to the coal bunkers under the roof of 15,000 tons capacity.

The actual dimensions of the main building are 453 feet 6 inches long by 175 feet wide, and the height to the ridge of boiler house roof is 145 feet. The four chimneys are each 275 feet high.

The building is of the steel-framed type. The whole of the weight of the structure and internal fittings is carried by the steelwork, the brickwork simply forming the casing.

For the protection of the steelwork Dixon's Silica-Graphite Paint was specified, one coat at the mill and two coats after erection—the mill coat Dark Red, the first field coat of Natural Color, and the finishing coat Dark Red.

The British Westinghouse Company obtained the contract for the steel frame of the building and it was erected by Messrs. Mayoh & Haley (the Fulham Steel Works Company) as sub-contractors. Messrs. Mayoh & Haley also obtained a direct contract from the Underground Railways Co. for the erection of the brick-work. Their superintendent in charge of this work was Mr. B. B. Tarring. The following particulars of the materials used will give some idea as to the extent of the work:

Fletton bricks	6 million.
Terra cotta in string courses, arches, cornices, etc.	17,000 cubic ft.
Specially made arch bricks, all of different patterns,	85,000.
Red pressed facing bricks	85,000.
Portland cement	600 tons.
Hydraulic lime	260 tons.
Glass in windows	50,000 ft. super.
Paint	25 tons.
Steel work in framing and structure	6,000 tons.
Sundry steel and iron work not included in main structure	2,000.

Brick work commenced	June, 1903.
Finished	March, 1904.
Steel work commenced	May, 1903.
Finished	December, 1904.

Mr. J. W. Towle, late chief engineer to the Dublin United Tramways, Ltd., has supervised the erection of this power station and the installation of all the plant, and as engineer for power is responsible for its efficient working as well as for the sub-station plants.

In 1827, nearly eight decades ago, Joseph Dixon began to manufacture graphite (then usually called "plumbago" or "black lead") crucibles. In a short time he had nearly revolutionized metallurgical methods. To-day all graphite crucibles, wherever made, are imitations of the formulas and methods invented by the father of the plumbago crucible business and founder of the Dixon Company, Joseph Dixon. To-day our plant for the manufacture of graphite crucibles is the largest, most up-to-date, most scientific and most perfectly fitted up in the world.

Every manufacturer having occasion to use crucibles, knows how important it is to get good crucibles, and how expensive "cheap" crucibles are. One poor crucible may mean the loss of much money and valuable time—there is no risk with Dixon's Graphite Crucibles, for each one is carefully tested before being shipped from the factory.

PAINT FOR TROLLEY POLES.

The distinct advantages of Dixon's Silica-Graphite Paint for protecting wood trolley poles are being demonstrated by the good results of practical tests. For many years Dixon's Silica-Graphite Paint has proved its superiority over other paints for the protection of metal poles, guarding the surfaces from corrosion as well as presenting an attractive appearance unaffected by years of service.

As a standard coating for wood trolley poles Dixon's Silica-Graphite Paint, Olive Green color, has proved extremely popular. There are several good reasons for its use, but perhaps the most important to the street railway man is the fact that it saves money for his road, at the same time giving much satisfaction on account of the desirable color effect. Expense is lessened because Dixon's Silica-Graphite Paint will many times outwear the cheaper paints, thus saving the heavy cost of frequent repainting. Frequent repainting of trolley poles is something a street railway man is anxious to avoid.

Dixon's Silica-Graphite Paint is easily applied—it covers well, wears well, looks well. The nature of the paint permits it to enter every crack and crevice of the wood, thus protecting the pole with a coating unaffected by the fierce storms of winter or the burning sun and wind-driven dust of summer. It is a coating that will wear for years. Instead of fading like a lead paint Dixon's Olive Green grows darker as the Ticonderoga Flake Graphite asserts itself, producing an artistic effect in perfect harmony with the foliage so much desired by street railway officials who realize the importance of having a picturesque roadway for their patrons.

Among the roads on which Dixon's Silica-Graphite Paint is being used for trolley poles is the Public Works Co., Bangor, Me. One can enjoy some delightful scenery on the lines of this company. The strong, carefully selected poles, worthy products of the Pine Tree State, are well protected with Dixon's Olive Green.

THANKFUL FOR THE CAR.

Supt. Foster of the New Orleans Street Railway Company, formerly with the Boston & Northern at Salem, tells the following story of the days when 'spotters' were much in evidence on the cars:

"A young fellow who had charge of one of the Salem Willows cars during the rush season was suspected of more than the ordinary 'knocking down.' He turned in his trips at the Salem office, and the cashier, who was aware of what was going on, said, 'Thank you.' The next trip he turned in still less, and the polite cashier thanked him again. The third trip he brought in still less money, but the cashier was there with his smiling 'thank you.'

"'What the deuce are you thanking me for?' asked the conductor.

"'For bringing in the car,' replied the cashier."

—Boston Herald.

DIXON'S GRAPHITE EXHIBIT, COLUMBUS CONVENTION, OCTOBER 15th TO 19th, 1906.
AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.

Dixon's Graphite Exhibit at the Columbus Convention was of a very unique design, differing in every feature from any exhibit ever made by the Joseph Dixon Crucible Company.

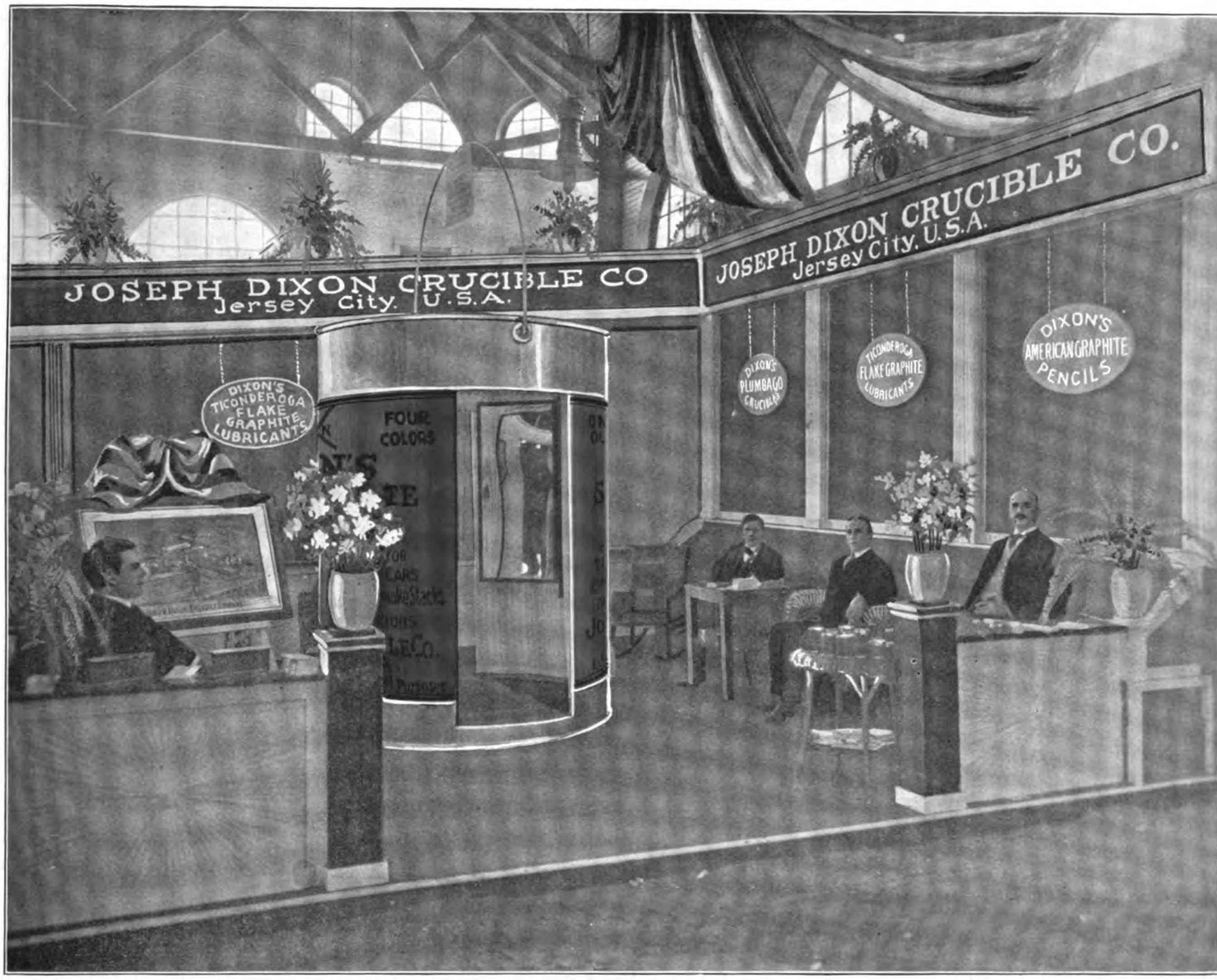
The design and arrangements for the display were made by Mr. C. H. Spotts, Manager of the Paint Department, who entrusted the building of the mammoth paint can and the exhibit to the Globe Decorating Company of New York City, who completed the entire exhibit ready for visitors some days in advance of the opening of the Convention.

Dixon's space occupied the corner to the right at the main entrance to Building No. 4. Visitors on entering immediately observed the harmonious and attractive color effect of the display. The ten foot wide entrance indicated a spirit of "welcome," which characterized the entire arrangement and management of the Dixon Graphite Exhibit.

The finishing of the booth was in deep shades of green burlap, with a special white treatment for ornamentation. A large number of polished plumbago crucibles, one of the products of the Joseph Dixon Crucible Company, were used as jardinieres for holding the chrysanthemums and delicate ferns, which were placed at appropriate places, giving a decidedly artistic effect to the exhibit.

The center of attraction was Dixon's mammoth paint can, standing in the middle of the booth, being a reproduction of the gallon size can of Dixon's Silica-Graphite Paint. The dimensions were eleven feet in height, including three feet of handle; six feet in diameter and twenty feet in circumference, with openings for entrance and exit, six feet high, two and a half feet in width. A sign stated that a can of this size would hold 1600 gallons of Dixon's Silica-Graphite Paint, or sufficient to properly cover one coat of 800,000 square feet of metal. The finishing of the can was very striking, it having a ten inch finish at the top, and seven inch finish at the bottom in silver leaf, and the famous Dixon orange colored label, reproduced between the silvered points; the entire surface being highly polished.

The interior of the can was tastefully finished in white, with an arrangement on the sides of three large convex mirrors. One of the convex mirrors gave the effect of stoutness, and had over it a sign: "Specifiers and users of Dixon's Silica-Graphite Paint become in-fat-uated with it." Another mirror gave a skelton-like appearance, and over this mirror was the suggestion: "Rust makes the metal thin;" "repainting makes the pocketbook thin;" "worry makes the body thin." "Moral: Protect metal from rust with Dixon's Silica-Graphite Paint." Another mirror was of the triple convex form, giving a person standing before it the appearance of giraffe-like legs and stout body. A new effect was secured



DIXON'S GRAPHITE EXHIBIT, COLUMBUS CONVENTION, OCTOBER 15th TO 19th, 1906. AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.

in the exhibition of this mirror by placing a chair in front of it, and the person seated had the legs dwarfed, and the body vastly lengthened, just the reverse appearance of the person standing along side.

The delegates, exhibitors and visitors were greatly amused with Dixon's mammoth paint can containing the distorted or laughing mirrors. Comfortable wicker chairs and an upholstered seat, twenty feet in length, provided places for rest and general comfort. All callers at Dixon's Exhibit were asked to sign the visitor's cards and retain the Dixon Eterno Indelible pencil with which the name was signed.

Dixon's miniature paint pails containing aluminum thimbles were presented to the ladies, and miniature Dixon's paint pails with dice were presented to the gentlemen.

Displays were made of Dixon's Plumbago Crucibles; Dixon's American Graphite Pencils; Dixon's Ticonderoga Flake Graphite Lubricants; Dixon's Special Graphite No. 635; Dixon's Graphite Cup Greases; Dixon's Graphite Wood Grease; Dixon's Waterproof Graphite Grease; Dixon's Pipe-Joint Compound; Dixon's Everlasting Axle Grease; Dixon's Silica-Graphite Paint; Dixon's Graphite Curve Grease; Dixon's Graphite Motor Brushes; Dixon's Commutator Compound; Dixon's Graphite Foundry Facings, and Dixon's Air Brake and Triple Valve Grease.

Dixon's representatives in attendance were Mr. D. M. Howe, Manager of the Pittsburg office, Farmers' Bank Building; Mr. L. H. Snyder, M. E., Department of Lubricants, Jersey City; Mr. F. R. Brandon, Department of Lubricants, Chicago office, Monadnock Block, and Mr. C. H. Spotts, Manager of Paint Department, Jersey City.

DIXON'S PENCILS IN RAILWAY SERVICE.

For general service Dixon's "Eterno" is a very popular style. This is an indelible pencil that writes black and copies purple. Can be furnished with a nickle point protector that not only prevents the point's breaking but also keeps the lead from soiling the clothes or papers in the same pocket with it.

For checking purposes Dixon's "Operator" or "Ultimatum," which has a lead of large diameter will be found desirable.

Dixon's "American Graphite" pencils in both round and hexagonal shapes will be found highly satisfactory for general office work. These can be secured in several degrees of hardness, according to the particular work required or the preference of the user.

Those who want nothing but the best should use Dixon's "Artists" of perfected graphite, which are procurable in eleven degrees of hardness.

STREET CAR ELEVATED STRUCTURE, HOBOKEN, N. J.

The two-track steel elevated structure of the Public Service Co. extends from the Delaware, Lackawanna & Western Passenger Terminal, Hoboken, to Hoboken Heights, a distance of a mile.

Lead and oil paints failed to protect this structure from rust, and the steel was in a very badly corroded condition in the fall of 1899, when the street railway officials directed that the entire structure be thoroughly cleaned of rust and blistered paint, and given two coats of Dixon's Silica-Graphite Paint.

Dixon's Natural Color was used for priming coat and Dixon's Dark Red for finishing coat. The two coats of Dixon's Silica-Graphite Paint stopped initial corrosion and have protected this structure from rust for seven years.

PAINT FOR CAR BARN ROOFS.

Engineers in control of the maintenance of street railway buildings will be interested in the economy of using a protective coating that will not have to be renewed every year.

Paint economy is to be found in the protective coating that saves the metal from rust destruction for the longest period of time.

The fall or spring season is best suited for painting steel roof trusses and metal roofs of car barns. Paint applied in these seasons dries by natural oxidation, and the upper portion of the film is not hastened as it is in the hotter days; the original elasticity is therefore maintained longer and the coating is much more serviceable.

The paint-destroyers and rust-producers—sun, rain, ice, snow and gases—can be successfully resisted for many years by the application to all classes of metal work of any of the four colors of Dixon's Silica-Graphite Paint.

Ease of application, good covering power and effective protection for the longest period of time prove Dixon's Silica-Graphite Paint to be the most economical preservative coating for metal and wood that has ever been produced.

Car barn roofs, by reason of their full exposure to the elements, require thorough treatment to properly protect the surface from rust.

It is good painting practice to insist upon Dixon's Silica-Graphite Paint being delivered in original packages; that no thinners or dryers be used; that all rust, blistered and cracked paint and dirt be thoroughly removed. These broken places in the old coating should be covered with Dixon's Silica-Graphite Paint the same day they are cleaned. After the touched-up places are properly dried, the entire surface should have an evenly brushed-on priming coat of Dixon's Silica-Graphite Paint. This first coat having been allowed to dry for three or four weeks, a finishing coat of Dixon's Silica-Graphite Paint to be evenly brushed on, of a color selected from Dixon's folder "Colors and Specifications."

A great many street railway companies have adopted this thorough method of roof protection, with a consequent saving in the cost of renewal of roofs and frequent repaintings.

STREET CAR FAVORS.

Mark Twain.

It is said that Mark Twain was standing in a crowded street car, hanging to a strap, and as the car swung around a corner the strap broke, dumping him into the lap of a well-dressed woman. The humorist arose and bowed. "Madam," said he, "this is the first time the street car company ever conferred a favor on me."—*Exchange.*

MARKET STREET, FROM ELEVENTH STREET TO THE CITY HALL, PHILADELPHIA, PA.

Market street, Philadelphia, is one of the busiest streets in the United States. The photographer secured an interesting view which includes, at the right, the Philadelphia and Reading Railroad Terminal, famous the world over for its size, terminal facilities and its notable fronts, graceful in architectural lines and features, that are unrivalled by any other railroad station in the world. Both sides of the street in the view have wholesale and business houses of national reputation. A portion of the costly and magnificent City Hall is seen in the distance.

At the corner of City Hall Square, Market and 13th streets, through to Chestnut street, is being constructed the largest department store in the world, John Wanamaker's, which covers a site 246 x 476 feet, and will contain a floor area of 1,600,000 square feet of surface. The 26,000 tons of structural steel is being protected from corrosion with Dixon's Silica-Graphite Paint, Natural and Dark Red Colors.

Among buildings of such magnitude and excellent architecture, with constantly passing crowds of people, it is of importance that the iron trolley poles along both sides of the street be kept in good condition, that is, free of rust, so that the poles will not be undesirably conspicuous alongside of other structures of architectural prominence. Pole neglect also allows of rust weakening the strength of the poles.

The Philadelphia Rapid Transit Company officials take special pride in having their iron trolley poles kept in good condition by evenly applied coats of the best pole paint that they can procure.

It is appropriate to state that Dixon's Silica-Graphite Paint, Olive Green, protects and gives a good appearance to the trolley poles shown in the illustration.

We will be glad to send to Line Superintendents of Street Railways, free of cost, samples of any of the four Dixon Colors, for testing on steel and wooden trolley poles.

THE PAINTER CAN TELL YOU

About the economy of using an easily applied paint. One that works smoothly and well in all kinds of weather. The lubricating properties of Dixon's Ticonderoga Flake Graphite pigment allow of the painter brushing Dixon's Silica-Graphite Paint on to the surface with great ease. There is a consequent saving in cost of labor and brushes in application. Another factor in favor of Dixon's Silica-Graphite Paint is its excellent spreading and covering power.

THE PAINTER.

Its covering power is generally estimated at about 500 square feet to the gallon for first coat, and about 550 square feet to the gallon for second coat, of sufficient film thicknesses for adequate protection.

The reliable painter will also tell you that Dixon's Silica-Graphite Paint will save the cost of cleaning, brushes, material and labor in frequent repaintings. Time tests have proved it the best. Ask the Painter!

(Illustration secured from and copyrighted by Judge Company, 1906.)

Reproduction of Dixon's Mammoth Paint Can,

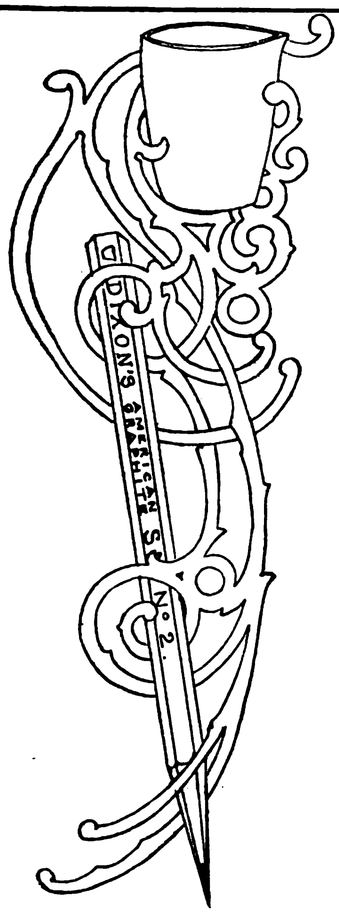
Dixon's Graphite Exhibit, Columbus Convention,

American Street and Interurban Railway Association.

Graphite.

VOL. IX. JANUARY, 1907. No. 1.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



With ten thousand thanks for all favors received, the Joseph Dixon Crucible Company wishes a prosperous,

HAPPY NEW YEAR

to all its many friends.

EIGHTY YEARS YOUNG—AND STILL GROWING.

The Joseph Dixon Crucible Company is, as Fra Elbertus would say, "eighty years young"—and still growing. This "figure of speech" is especially fitting and nicely descriptive, for the Dixon Company, while ripe in experience that time only can give, has all the virile strength and energy of youth. Its four-score years of business activity have naturally led it through many business vicissitudes, but each has served to build well a stronger foundation for the future and finally placed it in the front rank of its chosen industry.

There is a certain uniqueness about the Dixon Company. It handles chiefly but one product, graphite, which appears to the layman to be little more than black dirt. Certainly there is nothing about graphite in itself to attract; it is dull, prosaic, uninteresting. But what a marvelous wonder-worker it is when set to the innumerable and diverse tasks for which it is adapted. Graphite might be called phlegmatic and stoical, for heat, cold, acids and alkalis alter it no way—their influence goes unnoticed. These characteristics make graphite almost indispensable for crucibles, facings, all refractory products, paint pigments, etc. Graphite has also been described in the popular vernacular as "smooth and slick," and so it is. These qualities make it invaluable for all lubrication. Nature has fitted it for varied applications in electrical work, for pencils, for polishing purposes, and so on, one might almost say, ad infinitum.

So universal is the favor with which Dixon's products meet that plans for the extension of the plant, already large, have been made necessary. If it is possible to concisely state the causes for the success of the Dixon Company, it may be said that this has been brought about by "good goods", enterprise, and a "square deal" business policy.

AN "AMERICAN GRAPHITE" PENCIL.

A percentage of the Dixon pencils are stamped "Dixon's American Graphite." This trade mark signifies a superlative pencil. Special graphite is chosen for them, it receives longer and more specific preparation. They stay in the works much longer in the passage through its many processes. The result is a peculiar strength or toughness of the lead, also a peculiar smoothness. The two indispensable qualities of a perfect pencil are thus obtained, viz: the leads won't break, and a touch is given to the paper that is deliciously smooth, soft and velvety.

For this reason when you stock up for counting room use, ask for pencils stamped "Dixon's American Graphite," and if for average desk work see that it is in addition stamped "S. M.," which means medium soft, and you will get a pencil that will stand the most exacting tests.—JOHN A. WALKER.

AMERICAN TEAS ON SALE.

Marketing was begun on December 11, 1906, of the first crop of American tea grown on a commercial scale. Twelve thousand pounds have been raised on a plantation in Colleton County, a few miles from Charleston. For several years tea has been marketed from Pinehurst, the Government experimental garden at Summerville, but the product marketed to-day is the first of a purely commercial venture.

The output for 1907 promises to be very large.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

BRANCHES AT

68 Reade St., New York. 1020 Arch St., Philadelphia.
26 Victoria St., London. San Francisco, Cal.

RESIDENT REPRESENTATIVES AT

Boston, Chicago, St. Louis, Washington, Baltimore, Pittsburg, Paris, Hamburg, Vienna, Amsterdam, Brussels, Berlin, Dresden, Milan, Lisbon, Copenhagen, Warsaw, Barcelona, Bergen, Horgen (Switzerland), Finland, Havana.

GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

OFFICERS:

E. F. C. YOUNG, *President.* JOHN A. WALKER, *Vice Pres. and Treas.* GEO. E. LONG, *Secretary.*

DIRECTORS:

E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., January, 1907.

GRAPHITE MINES AND GRAPHITE MINING.

Looking over our scrap book we are reminded of the many graphite mines that have been discovered and their wonderful richness and the probable tons of ore to be produced and sold at prices to make all rich who are quick enough to get in and secure a few blocks of stock at once.

We are also reminded of how necessary it is to have a feature well described in a newspaper in order to get people to believe it. A description in a newspaper seems to carry with it some hypnotic influence that makes people believe not only what is, but what is not.

If the one hundredth part of the printed talks of the richness of these graphite mines had been true Dixon to-day would not be "in the ring." We are, however, and the shores of time are full of wrecks of graphite mines that were to produce graphite so rich in quantity that no other graphite mines could compare.

The sole surviving parts of these schemes have been the promoters and they have bobbed up serenely time and again, for we note the same names to some extent appear in later affairs of the kind.

There is nothing remarkable in finding graphite deposits. Graphite is found in many parts of the United States and especially along the Appalachian chain from Canada to Alabama. Often graphite is found of surprising purity and in the form of good sized nuggets, but such finds are worthless except as specimens for the gatherers of such for museums, or specimens for the promoter to make use of in exploiting the mine and in securing victims who are sure to lose their money, as such mines are only "pocket mines," and graphite is of too little value, comparatively speaking, to make such a mine of value as a graphite producer on a commercial basis.

COMMANDER U. S. N.

He Understands the Value of Graphite as a Lubricant and Appreciates It.

A Commander in the United States Navy writes us as follows:

"I beg to acknowledge receipt of your favor of the 22nd, requesting me to give you the results of using the samples of graphite which you sent me on September 18th for use on my automobile.

"I am glad to say that I have had excellent results in using this graphite.

"I have used the grease in the universal joints of the shaft, and I have used the powdered graphite in the cylinders by putting it into the crank case, as my engine is oiled by splash lubrication.

"I also mixed your finely powdered graphite with oil, and used it on every bearing of my car. I mixed it in a small squirt can. I consider that it saves oil, and altogether is an excellent lubricant.

"I have a Franklin air-cooled light touring car."

DIXON'S LUMBER PENCILS.

The Dixon Crucible Company has manufactured lumber pencils for nearly half a century. In the beginning it manufactured one kind only. At the present time it offers to the lumberman fifteen varieties.

These lumber pencils and crayons are made in various colors, and the graphite or black ones are made in different degrees of hardness.

A short time ago we received a letter as follows:

"We handle several kinds of lumber crayons. Will you please send us a sample of crayon suitable for marking green pine lumber. We find it a hard matter to get them just right, they are almost always too hard or too soft."

In reply we sent the following:

"We are in receipt of your favor of the 28th, and are sending you by mail samples of our black and blue lumber crayons, and wish you would try these on the lumber and see how they work. If they do not suit you exactly please let us know in the enclosed stamped envelope and we will send you others that may be nearer the mark. Please let us know just wherein they come short, whether they are too soft or too hard."

We received the following in reply:

"Dixon's No. 365 is all O. K., does the work perfectly."

The above correspondence will show how we look after such matters, and the further fact that if one pencil is too hard or too soft another may be "all O. K."

DIXON'S publications will be sent free upon request.

PUMPING DEVICES FOR OPEN TANK SERVICE.

By W. H. Wakeman.

In thousands of buildings of various kinds and different heights it is necessary to maintain one or more tanks on the roof or in the upper story for the purpose of holding water to supplement the local department in case of fire, or for various uses in every-day service in and about the buildings. The expense of buying water from the water company, the lack of sufficient pressure in the mains to deliver this water where it is wanted in high buildings, or a combination of the two reasons given, makes it necessary in many cases to elevate it from wells, brooks, or street mains into these tanks by means of suitable pumps.

As the amount of water drawn out of these tanks from time to time varies greatly, and inasmuch as it is advisable to keep them nearly full without causing them to overflow, some kind of an automatic device is necessary to control the delivery of water that will be reliable in service and require little attention from the engineer in charge.

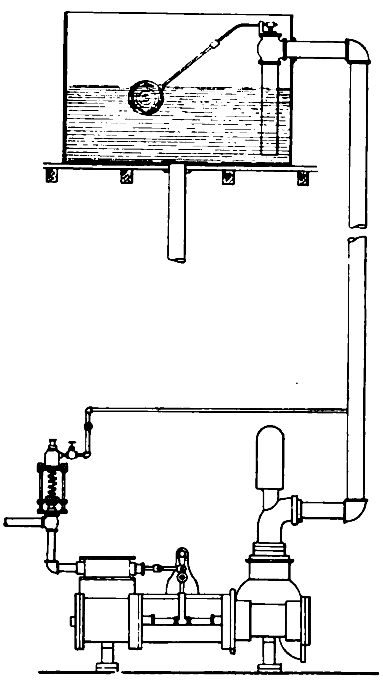


FIG. I.

Fig. 1 represents an ordinary steam pump fitted with one of these devices. It is pumping water into an open tank, and near the end of the discharge-pipe there is a float-valve which shuts off the supply when the tank is full. Closing this valve causes pressure to rise in the discharge-pipe, and as there is a small pipe connected into it, this pressure is communicated to the regulator on the steam pipe, which is adjusted to close at a pressure slightly above normal conditions, thus shutting off steam and stopping the pump. When the water level in this tank is lowered a few inches, the float-valve opens, lowering the pressure, which permits the regulator-valve to open and admit steam to the pump again, thus securing water to maintain the desired quantity. These tanks should always be painted with Dixon's Graphite Paint to prevent rust and corrosion if made of iron, and to preserve the wood where tanks are made of this material.

An ordinary unbalanced float-valve will not answer for this service, as it will work so hard that much force will be required to close it, and when the water level falls it will not open easily with full pressure acting on it. Fig. 2 illustrates a balanced valve that overcomes these objectionable features, as it is so nearly balanced that but little force is required to close it, and for the same reason it opens easily. It must be connected so that water will enter at the side and be discharged through the bottom.

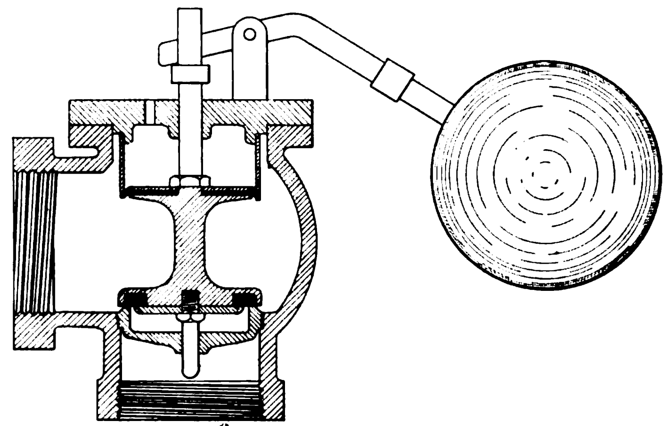


FIG. 2.

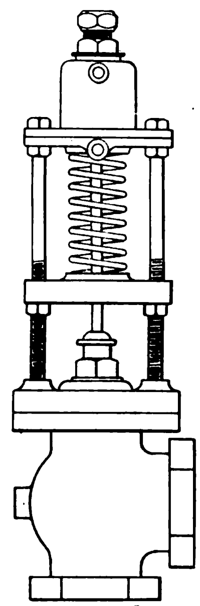


FIG. 3.

Fig. 3 illustrates a reducing valve or regulator, which may be used in the steam pipe of a pump to control its speed. With ordinary pressure in the discharge water pipe, the helical spring (more commonly but incorrectly called a coil spring), keeps the steam valve open, but when closure of the float-valve causes pressure to rise in the discharge water pipe it acts on a diaphragm in the regulator, and overcoming the spring closes the valve.

In cases where the pump is to be shut down for a long time without attention from the engineer, a special fixture may be required, but the foregoing description explains the principle of operation.

Poor cylinder oil is sometimes used to lubricate the cylinders of pumps that are fitted with these economical and useful devices, and as this oil goes through the regulators also, they soon become so clogged with sediment from the oil that they are absolutely useless, which is certainly a great mistake. It would be much better to use Dixon's Flake Graphite and eliminate the objectionable oil entirely.

Fig. 4 illustrates a pump driven by an electric motor operated by a controller to maintain a water supply in an elevated tank. The illustration shows the tank just after it

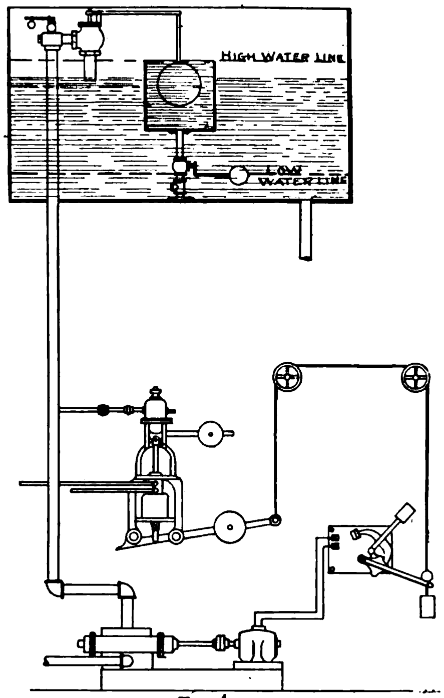


FIG 4.

has been filled, and the motor is now at rest. Water is being drawn out for use in the building below, thus lowering the water line, but the pump is not started because the small auxiliary tank remains full, and this holds the float up, keeping the discharge valve closed.

When enough has been drawn out to bring it down to the low-water line, the lower float-valve will open and quickly empty the small tank, thus lowering the large float and opening the discharge valve. As this at once lowers the water pressure, the reduction is communicated to the controller, its position is reversed, causing the large round weight to descend, drawing the small wire cable over the two pulleys shown, which throws the switch in and starts the motor, thus filling the tank again.

The first effect of putting in more water is to close the lower float, but nothing else happens until the high-water line is reached, when water flows over into the small tank, raises the float, which closes the discharge or float-valve in the water pipe and stops the pump by causing the controller to throw out the switch, thus bringing it again into the position shown.

The object of this is to prevent the motor from being started and stopped often, as it would be if only one float-valve was used to control the pumping system. A small safety-valve is shown at the top of the discharge water pipe, so that if the motor fails to stop on account of derangement of the connecting devices, the safety-valve will open and prevent excessive pressure in the pipe. Attention is called to the fact that there are no wires connecting the float with the motor, as only those from the dynamo, or the street service wires, to the motor are used in connection with this ingenious device.

In buildings where an engine is run every day it is often advisable to utilize power from this source for pumping water, or in other words to run a power pump. In order to do this satisfactory it is necessary to have a pump large enough and give it sufficient speed to supply the maximum quantity desired. An arrangement for shutting it down when the tank is full should form part of the outfit, as otherwise it would not be complete.

Fig. 5 shows a power-pump fitted with an automatic belt shifting attachment which operates as follows: When the pump has filled the tank, which action closes the discharge water-valve or float-valve and commences to raise pressure in the discharge pipe, it is communicated to the small pilot-valve shown in front of the pump. This opens and allows water under high pressure to enter the horizontal cylinder near the valve where it operates on a piston, forcing it to the left hand, carrying the belt-shifter with it, running the belt on to the loose pulley and stopping the pump.

When water is drawn out of the tank, causing the float-valve to open, pressure is at once reduced in the discharge pipe. The weighted lever in front of the pump is lowered, shutting off water from one side of the piston and admitting it to the other, thus forcing it to the right hand again, running the belt back on to the tight pulley and starting the pump. This operation is repeated as often as the service requires, and there is no waste of power, as the pump is idle when water is not needed.

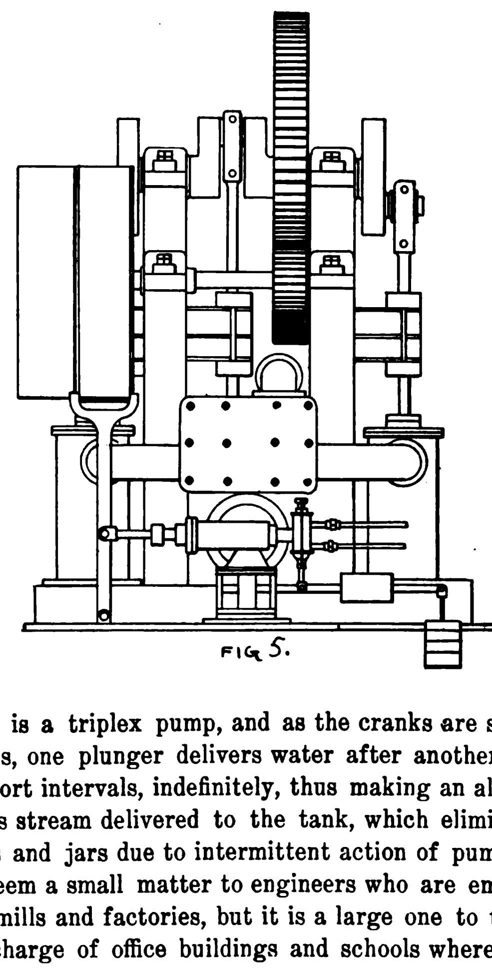


FIG 5.

This is a triplex pump, and as the cranks are set at 120 degrees, one plunger delivers water after another at equal and short intervals, indefinitely, thus making an almost continuous stream delivered to the tank, which eliminates the shocks and jars due to intermittent action of pumps. This may seem a small matter to engineers who are employed in noisy mills and factories, but it is a large one to those who have charge of office buildings and schools where all noise is objectionable. Dixon's Traction Belt Dressing should be used on these belts, as it will prevent slipping and squeaking, causing the pump to start promptly.

Of course it is possible to run a power pump without this controlling device, but it requires time and care to run the

belt off when the tank is full, then to run it on again when more water is wanted. This plan almost always results in the loss of power by pumping water when it is not needed, flooding roofs, &c., also in lack of water due to an empty tank when it is wanted.

In many important buildings no steam is used during the summer and only a low pressure is available in winter. In such cases a gas engine may be used to pump the water, and while it is possible to run a power pump with a belt from an engine of this kind, the same as any other machine would be run, it would then be necessary to start the engine when water is wanted and shut it down when the tank is full, causing much unnecessary care and attention, especially if varying amounts of water are used from time to time.

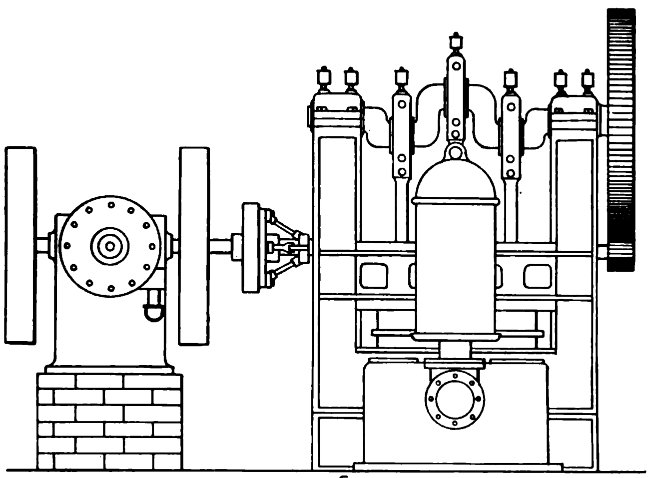


FIG. 6.

Fig. 6 illustrates a triple-power pump driven by direct connection to a gas or gasoline engine. There is a clutch between them, however, which may be operated by hand or by means of a special device that stops the pump when the tank is full and starts it again when more water is needed. If the pump is to be stopped for an hour or more, it is a good plan to stop the engine also, unless it is run to supply power for other purposes. If steady power is wanted, then the automatic clutch should be installed, and it will take care of the water supply without constant watching.

The principle on which this operates is similar to that already described in connection with the belt-shifting device. It is very economical in the use of power, as the pump runs when it is needed and at no other time.

This pump is fitted with seven grease cups in which Dixon's graphite grease may be used to good advantage. These are automatic cups, which feed this grease to keep bearings cool, rather than to wait until they heat enough to cause the grease to melt. This is an important difference that ought not to be overlooked.

CEYLON GRAPHITE.

It is singular that graphite of a quality suitable for crucibles should not be found in any other locality than the Island of Ceylon. To be sure, large graphite deposits are found in other parts of the world, and while they are suitable for certain uses, they do not answer for the manufacture of crucibles.

Ceylon graphite is particularly adapted for this purpose. It not only is quite pure, but possesses a fibrous nature which prevents the crucible from breaking. If graphite without a fibrous nature were to be used in crucible manufacture, the crucible would have no grain to it and would break like clay. The quality of Ceylon graphite is such that it imparts a wood-like texture to the crucible and renders it tough. Were it not for this fact, a crucible could not be made to stand the heavy weight of metal that it does. The fibrous quality of Ceylon graphite may be seen by referring to the illustration.

Ceylon Graphite.

Ceylon graphite is the most expensive grade that is found on the market. The demand for it, and the long distance that it has to be carried, are the cause of this. The methods of mining the graphite are also primitive and the natives, in whose hands the mines are, are loath to make any progress. When the demand for graphite falls off a little, they curtail the productions and thereby stimulate the price. As far as the crucible manufacturer is concerned, they certainly have matters in their own hands.

Ceylon graphite is used in other products besides crucibles and it is probable for the line of work, where the graphite is finely ground, that the artificial graphite that is now being made will replace it to a certain extent. As far as purity is concerned, the artificial graphite leaves nothing to be desired and all that is lacking in it is the fibrous nature.

—*The Brass World.*

BRITAIN BEMOANS THE LOSS OF AMERICAN TRADE.

In the British consular report, published here, it is stated that there is a great falling off in the trade between Mexico and Great Britain both in quantity and value as compared with that of the United States. The report states that the geographical advantages possessed by the United States offset the great transportation facilities which Great Britain can offer.

In conclusion, the report states that the British have practically withdrawn from Mexico just at a time when the seed which they so plentifully had sown was about to bear fruit.—*Mexican Herald.*

WILFUL WASTE.

There is an old adage to the effect that "wilful waste brings woeful want." While such an extremity may not always result, certain it is that wilful waste eats chunks out of the profits and has a diminishing effect upon the balance sheet.

It is chiefly in the little items of expense that waste goes on unhindered, for these little items usually escape attention. But small leaks are the most insinuating, unperceived they constantly gnaw at the profits.

To accompany our text we have thrown on the curtain a picture which serves to show one of the common sources of waste in almost every plant of any size. The broken pipes and smashed joints are worth only the price of scrap iron, they represent wilful waste. And they result from the use of red lead and other cements that render unmaking of joints almost impossible without damage to tools or fittings.

The way to prevent this is to use Dixon's Graphite Pipe-Joint Compound, which simultaneously prevents leaks in pipe-joints and waste in cost of shop maintenance. This first it accomplishes because of its lubricating nature (due to the presence of the Ticonderoga Flake Graphite) which permits of joints being screwed up to a perfectly tight fit. Because red and white lead lack this lubricating quality they retard rather than assist the making of joints in which the screw threads themselves snugly interlock.

These lubricating properties also result in Dixon's Graphite Pipe-Joint Compound, saving waste as pictured above. While joints will be kept perfectly tight indefinitely, they may be opened at any time by the use of an ordinary pipe wrench. You don't need a hammer, you won't have to get new joints (with the possible annoying delays, wrong sizes, etc.)—you save time, you save money, you save nervous energy, you stop wilful waste.

Among your New Year's determinations make a resolve to use Dixon's Pipe-Joint Compound—and keep it.

HOLDS RECORD FOR ERRORS.

There is a sentence which is said by grammarians to have lived for a hundred years on account of its tremendous error. In this sentence every word, every single word, is ungrammatical. The sentence was spoken by a little girl in a sheep pasture. Looking at the flocks, she said to the shepherd:

"Is them sheeps yours?"

This sentence, with every word incorrect, holds the record in its class.

EXTRACTS FROM "TIXCOBOB TICKLER."

Sent by our Mr. A. C. Bowles from Mexico.

We sat out in the gloaming, last evening, listening to the cheerful chirping of the insects and to the plaintive notes of the ruiseñor. Our heart was full of the charm of a tropic night, and we vibrated in unison with all the saints and sages who have beckoned humanity to higher and more tranquil regions beyond this low and sordid plane of existence. The alcalde was strumming his guitar preparatory to our customary outdoor musicale, when a perspiring lad on a foaming steed rode up, tossed us a green envelope and departed like an exhalation.

We feverishly tore open the wrapper and found a yellow circular which was printed in carmine. It said: "Furriners run for yer lives. The Archipámpano of Chiapas is advancing on Oaxaca with 312,000 Guatemalan veterans, bound to redeem this fair land from the hidjus grasp of the outlander. He will spare no 1. He gives no quarter, nor even a peseta. Latin America in general shall be redeemed. Beware the Ides of September!!!!"

Cold sweat beaded our expansive forehead and we fanned ourself till the alcalde came, read the paper, called us in tender tones a "Pobrecito," and told us not to be "tan miedoso." He never sang more gaily, and our moral atmosphere again became calm. Still, what does it all mean? We shall wire to the Swiss minister in Mexico City for the protection of his navy.

DINNER TO MR. F. ENGELBRECHT

By a Goodly Portion of the Dixon Family with Vice-President Walker as Toast-Master.

Eugene Field, sad of countenance and ready of tongue, once strayed into a New York restaurant and seated himself for luncheon. A voluble waiter came to Field and said: "Coffee, tea, chocolate, ham—an' eggs—beefsteak—mutton-chop—fishballs—hash 'n' beans," and much more to the same purpose.

Field looked at him long and solemnly, and at last replied: "Oh, friend, I want none of those things. All I want is an orange and a few kind words."

At the start it was only "an orange and a few kind words" that were to be placed before "Fritz" by some half dozen of his fellow-workers in the Dixon Company, and in return he was to tell of his adventures and misadventures while on his vacation in Europe during the summer. He got the kind words all right, but he got the other things as well, as the following menu will show:

MENU.

Cocktail
Oyster Cocktail
Thick Green Turtle a L'Anglaise
Radishes Celery Olives
Filet of Sole Depoise
Sauterne St. Denis Cellars
Potatoes Persillade
Sliced Cucumbers
Larded Sirloin of Beef
Medoc
French Peas
Roman Punch
Roast Philadelphia Squab, Currant Jelly
Lettuce Salad
Fancy Forms of Ice Cream
Petits Fours
Roquefort and Camembert Cheese
Toasted Crackers
Benedictine, Cigars
Coffee

St. Denis Hotel,
New York,
November 20, 1906.

And instead of there being only half a dozen present, there were between thirty and forty—Mr. Engelbrecht's popularity and good-fellowship being too great to hold the dinner to "an orange and a few kind words," or the diners down to the genial half-dozen.

It is needless to add that the dinner was a success in every way, and to Messrs. Dailey and Norris, who had the matter in charge, much credit must be given.

WRITING BUSINESS LETTERS.

"I know," said a business man of wide experience, "how crowded with studies the schools are now, and I should be loath to recommend the introduction of any new ones; but I do wish sometimes that the boys and girls who are giving time to so many little fads could be induced to give more to the art of writing letters."

He did not refer to the mere art of writing correct English or the art of writing an interesting personal letter but to the preparation of really good business letters, in which the matter in hand should be treated not only clearly and concisely but also courteously.

The need he mentioned is one which is felt by thousands of business men and may well claim the attention of young people of both sexes who look forward to business life. The ability to write intelligibly is not rare, but the capacity to write in such a way as to produce a pleasant personal feeling for the house one represents is extremely rare.

Many writers fail in the matter of courtesy—either in the way of constant omission of articles and constant abbreviation, or, more commonly, in neglecting to give the other man the benefit of the doubt. In other words, the fault with most business letters is a fault of poor manners rather than of mental deficiency.

"Never, in any circumstances, allow your first letter, in a case of difference, to be harsh or discourteous," said a business man to one of his clerks. "No matter how much you think the man has injured us, give him the benefit of the doubt. Assume that he has made a mistake rather than that he has misrepresented. To take the other course is to enter a blind alley. You may have to turn around to get out of it."

—*Youth's Companion.*

MAN'S LIFE

is a "game" of cards. First it is "Cribbage," next he tries to "go it alone," at a sort of "cut," "shuffle" and "deal" pace. Then he "raises" the "deuce" when his mother "takes a hand" and contrary to "Hoyle" "beats" the "little joker" with her "five." Then with his "diamonds" he "wins" the "Queen of Hearts." Tired of playing a "lone" hand, he expresses a desire to "assist" his fair "partner," "throws out" his cards, and the clergyman takes a "ten" dollar bill out of his "on a pair." She "orders him up" to build the fires. Like a "Knave," he joins the "clubs," where he often gets the "high," which is "low," too. If he keeps "straight," he is often "flush." He grows old and "sees" a "deal" of trouble, when at last he "shuffles" off his mortal coil and "passes in his checks," and is "raked in" by a "spade."—Life's fitful "game" is ended, and he waits the summons of Gabriel's "trump," which shall "order him up" or turn him down.

DIXON'S NO. 635 FOR ELECTRICAL MACHINERY.

Every electrician having charge of electric cars knows the trouble often resulting from the use of grease or oil on cylinders of electric car controllers. Dixon's No. 635 will remedy all this trouble.

Being simultaneously the best solid lubricant known and a good conductor of electricity, it has demonstrated its value in actual practice. It puts a smooth surface on cylinder, allows controllers to be turned easily, prevents dust from sticking to the cylinder contacts, and requires attention no oftener than once a month.

This brand of graphite is further used with success on rawhide pinions of electric motors, all bearing parts of small motors, also on knife switches. Other uses will suggest themselves.

A GUIDE TO NEW YORK.

"A Day in New York" is the title of an interesting and helpful little booklet issued by the Joseph Dixon Crucible Company for visitors to the metropolis. General information as to the topography of the city, its main thoroughfares, points of interest, churches, etc., is given.

A unique feature, and one which will appeal to the visitor whose time for sight-seeing is limited, consists in plans for one-hour, two-hour, half-day, evening and whole-day tours of the city. The routes are carefully planned and remarkably comprehensive. Hints for saving time and trouble, rates for cab and coach hire and a list of subway stations complete the book.

The prospective traveler to New York, be he teacher or business man, should not fail to write for a copy to the Joseph Dixon Crucible Company, Jersey City, N. J. A postal request will bring it.—*The National Provisioner.*

MAKING PIPE JOINTS.

White and red lead for making up pipe joints are rapidly becoming, and should be, materials of the past. With these, the longer pipe joints remain unbroken the more difficult it becomes to take them apart and the greater the danger of ruining both pipe and fittings. For the last thirty years the Joseph Dixon Crucible Co. have been manufacturing and using a pipe joint compound especially adapted to screw joints. This compound has been experimented with until it has been rendered applicable to joints of all kinds, that is, for joints in water pipe, gas, steam, compressed air, gasoline, naphtha, etc.

The advantages to be had by using a graphite pipe-joint compound is that not only all the good features of white and red lead, shellac, soap, etc., are obtained, but a thorough lubricant as well, which enables the joint to be made up tighter without danger of cutting or otherwise injuring the threads. Furthermore, when it becomes necessary to break joints, the threads are left clean and bright and in the proper condition to make a tight joint when the joint is again made up. The user gets the benefit of a great deal of careful experimenting which in itself involves no small expense. Thus, for equal results the prepared compound is cheaper and more satisfactory than home-made dopes, whether they contain graphite or not.

Unless graphite is used in the proper quantities and incorporated in the preparation in the proper manner the desired results are seldom attained and the real advantages of graphite are not fully realized. That is where the result of experimenting becomes of value. Another advantage of the prepared graphite compound is that it will keep indefinitely and is always ready for immediate use when wanted.—*Southern Engineer.*

DIXON'S GRAPHITE WOOD GREASE.

Dixon's Graphited Wood Grease is a lubricant especially prepared for street railway cars. It has been upon the market a number of years and its function is to lubricate enclosed gears and to do away with dripping from the gear case of oil upon the tracks.

This lubricant is composed of finely ground, kiln-dried cedar sawdust, Dixon's best Ticonderoga Flake Graphite and the best procurable greases to be obtained in the market. Its use preserves the life of the gears, and it forms a cushion for the gears to mesh with, preventing wear as well as the noise so objectionable and undesirable in worn gears.

"BRICK."

The Joseph Dixon Crucible Co., Jersey City, N. J., has issued GRAPHITE for August. "Graphite" exists to lubricate the wheels of progressive industry.

> To things that often squeak and stick,
> Graphite imparts a motion slick;
> It's claimed that all else it excels
> In casting o'er machines "quick" spells;
> And the Dixon goods throughout the sphere
> Are made to bring industrial cheer.
> From pencils, used these words to write,
> To paint that makes all structures bright,
> Dixon claims the world's attention.
> Write to them for news and mention
> —*Brick.*

Some may think the above frivolous and not even "poetry," but those who were fortunate to have a copy of *Brick*, from whence the above is clipped, must acknowledge that as a record of the world's progress in the clay industry *Brick* is invaluable. We extend our felicitations to Messrs. F. S. Denfield, the manager, and Daniel Royse, the managing editor.

RING OUT, WILD BELLS!

From Tennyson's "In Memoriam."

Ring out, wild bells, to the wild sky,
The flying cloud, the frosty light;
The year is dying in the night;
Ring out, wild bells, and let him die.

Ring out the old, ring in the new,
Ring, happy bells, across the snow,
The year is going, let him go;
Ring out the false, ring in the true.

Ring out the grief that saps the mind,
For those that here we see no more;
Ring out the feud of rich and poor—
Ring in redress to all mankind.

Ring out a slowly dying cause
And ancient form of party strife;
Ring in the nobler modes of life,
With sweeter manners, purer laws.

Ring out the want, the care, the sin,
The faithless coldness of the times;
Ring out, ring out my mournful rhymes,
But ring the fuller minstrel in.

Ring out false pride in place and blood,
The civic slander and the spite.
Ring in the love of truth and right,
Ring in the common love of good.

Ring out old shapes of foul disease,
Ring out the narrowing lust of gold;
Ring out the thousand wars of old,
Ring in the thousand years of peace.

Ring in the valiant man and free,
The larger heart, the kindlier hand;
Ring out the darkness of the land,
Ring in the Christ that is to be.

—*International Railway Journal.*

COLLEGE VERSUS SHOP.

The Following is Clipped from "Science," by Mr. John A. Walker.

As to college discipline, says Dr. F. W. Taylor of the engineering department of the University of Pennsylvania, it can not be a good training for after life for a young man deliberately to be told by the university authorities that he can flagrantly neglect his duties sixty times in one term before any attention will be paid to it; while, if in business, the same young man would be discharged for being absent two or three times without permission.

My belief in the benefits to be derived from doing practical every-day work early in the college course is not the result of a theory. It is founded upon close observation and study of young men who have had this experience, and also upon a vivid remembrance of breakfasting each morning at five-thirty, and starting to sweep the floor of a pattern shop as an apprentice some thirty-two years ago, after having spent several years in preparing for Harvard College. The contrast between the two occupations was great, but I look back upon the first six months of my apprenticeship as a patternmaker as, on the whole, the most valuable part of my education. Not that I gained much knowledge during that time, nor did I ever become a very good patternmaker; but the awakening as to the reality and seriousnes of life was complete, and, I believe, of great value.

Commercial, manufacturing and other enterprises in which many men cooperate, are managed more and more by delegating all important decisions to a few men whose judgment has been trained through long experience, study and observation in those matters which they are called upon to decide. Yet many of our universities are managed by giving over to the young man, under the elective system, the final decision as to what studies will best fit him for his life's work, although he has, of necessity, but the vaguest idea of the nature of the subjects which lie before him. It is almost like asking him to lift himself up by his boot straps.

Of all the habits and principles which make for success in a young man, the most useful is the *determination to do and to do right all of those things which come his way each day, whether they are agreeable or disagreeable;* and the ability to do this is best acquired through long practice in doggedly doing along with that which is agreeable a lot of things which are tiresome and monotonous, and which one does not like.

I despise the pessimist who sees nothing but the defects and blunders of mankind, and the scold, whose pleasure it is to complain of all things as they are.

THIRTY YEARS OF THE TELEPHONE.

Interesting Scientific Facts Concerning a Wonderful Invention.

President Frederick P. Fish, of the American Tel. & Tel. Company, recently delivered an address before the Warwick Club, of Portsmouth, N. H., from which the following interesting excerpts are taken, says the *Denver Transmitter:*

"A man to tell the story of the telephone must be a poet, one of great literary attainments. No industrial enterprise has ever evolved so many of the elements appealing directly to the imagination. The invention of the telephone gave us a new art.

"It was only thirty years ago that it came into existence, one of the greatest imaginative feats in the annals of invention. It was first regarded only as a wonderful scientific toy. Not until late in the autumn of 1877 did anyone conceive the idea of making the telephone practical, adapting it to everyday commercial uses. One of the jokes of the early days was the statement that an investment of $3,500 would suffice to introduce the telephone in the city of Buffalo, N. Y. Since then $5,000,000 have been spent and only a beginning has been made.

"The spirit that animated the telephone pioneers was the same as that which has animated great artists, poets, authors, explorers and all other leaders of human endeavor. That our high civilization has not produced greater literary and artistic masterpieces is undoubtedly because imaginative men have turned their attention to industrial and mechanical enterprises.

"One thousand to one thousand two hundred miles is about the limit of successful telephone conversation at present," said Mr. Fish. "There are instances of conversations over greater distances, however. If recent inventions do what is expected of them, it may be possible for a man in New York to talk with a man in San Francisco in a few years.

"A curious fact is that if I were talking through the telephone to Chicago at the same time I am talking to you my voice would reach my Chicago hearers first. The voice travels from Boston to Chicago in six one-thousandths of a second. Without the telephone it takes the same length of time for it to travel six feet."

LUBRICATION OF COMPRESSOR VALVES.

Valves which stick can often be successfully lubricated and kept in good condition by the use of a little kerosene oil, applied with the usual machinery oil can.

—*Mining and Scientific Press.*

We quote the above paragraph to show how some people may be misled regarding the handling and care of air compressors, and because we believe that such articles as the above are often responsible for serious accidents. Kerosene oil ought never to be used in this way, and if used at all on the air cylinder, great care should be taken to remove all of it before starting up the compressor. A much better and safer way of cleaning the cylinder and valves is to feed ordinary soapsuds through the cylinders for several hours every week or two. It may be passed through the lubricator, instead of oil, but care should be taken to run with oil for a while after its use, before shutting down, in order to prevent rusting.

It is a very good practice to keep an extra set of outlet valves on hand, as this enables the engineer, at any time, to replace those on the compressor with clean ones. The change may be accomplished in a very few minutes and the dirty valves may be thoroughly cleaned by the engineer at his leisure.—*Compressed Air.*

All who are interested in the better lubrication of valves and cylinders of air compressors, and the avoidance of dangers that come from the use of oil, should write the Dixon Company for copy of "Air Compressor Lubrication."

THE PAST AND THE PRESENT,

The Old World and the New, Linked Together with Dixon's Pencils.

The Pencil Department of the Dixon Company recently received two letters from two very widely different places, one was postmarked "Konia," which is the modern name for the ancient city of "Inconium," in one of the provinces of Asia Minor near Mesopotamia; that country through which runs the Euphrates River and where was located the ancient city of Babylon. Near Inconium was fought the Battle of Issus between Darius, the Persian Emperor, and Alexander the Great, when the latter was starting out on his conquest of what was then called the "Known World."

There were no Dixon Pencils in those days, but now the decendants of these ancient Greeks and Persians write in excellent English that they are very much pleased with the samples we sent them, particularly the colored pencils, and that they use them in their school and college work.

The other letter was postmarked "Cagayan" in the Island of Mindanao in the Philippine Islands, and among other questions the writer asks for "the book that tells pencils." This is Dixon's Pencil Guide and is sent to those that ask for it. It is indexed by vocations so that everyone can select the particular pencil for any special work desired.

On this Island, in the far away Sulu Archipelago, there is a high school with 1,200 pupils and the teachers in that school are trying to make the children under their charge into good American citizens, and so they use Dixon's "American Graphite" Pencils in their school work.

NEW JERSEY AS A MANUFACTURING STATE.

New Jersey has high rank as a manufacturing State, and many persons imagine that all of the factories are owned by corporations. This notion is fostered by cart-tailers at election times, but, like most of their statements, it is mainly untrue.

The manufacturing canvass of New Jersey shows that there are 7,010 manufacturing plants in this State, of which 3,944 are owned by individuals, 1,220 by firms; 12 miscellaneously owned and 1,834 by incorporated companies. This is about 20 per cent. of the total.

Thus cold fact wipes out the cart-tailers' statement that there is no longer an opportunity for individual effort. The truth is that there never were better opportunities for brains, capital and enterprise than there are to-day, and men do not need to go away from home to seek them. They exist right here in New Jersey.—*Jersey City Evening Journal.*

"A STUDY IN GRAPHITE," WITH TESTS.

By Professor W. F. M. Goss, Purdue University.

In a few weeks the Dixon Company will publish a work under the above title.

This study was made with a view to investigate the behavior of graphite when used as a lubricant. It was not made for arguments in favor of the use of graphite but for facts, favorable or otherwise, that would serve to enlarge the sum of the world's information on the subject.

The Dixon Company has from time to time made public many of the facts demonstrated by Professor Goss, but has at no time attempted to give anywhere near the complete report.

However, the interest in graphite lubrication has grown to such an extent that the Dixon Company is frequently asked by superintendents of machinery, by students and even by instructors in mechanical departments of colleges, for detailed information relative to the function of graphite as a lubricant. It is because of such inquiries and because of the belief that the experiments of Professor Goss have a positive value to the mechanical world that we now put the tests in print.

The reader should know that nothing has been added by the publishers, but that the report of these tests is given verbatim and in its entirety.

The publication may be considered a classic, and worthy a place in the library of every one interested in graphite lubrication, or rather in the matter of *better lubrication.*

THE CUP THAT CHEERS.

And the Part Graphite Plays.

There are three varieties of the tea plant, from each of which both green and black tea may be prepared. Black tea is made from leaves slightly fermented, washed and twisted. Genuine green tea is made of the same leaves, washed and twisted, without fermentation; but commercial "green" teas are often black teas colored with Prussian blue, indigo, China clay, turmeric or gypsum.

Black tea is also adulterated to improve its appearance by being faced with plumbago* or blackhead, added in fine powder to the tea in a revolving cylinder, where the leaves, by being rubbed together, acquire a peculiarly smooth and glossy appearance.

Different qualities of strength and flavor in the tea are due to the varieties of the plant, to the soil and climate, to the age of the leaves, and to the mode of curing and drying them.

The younger leaves yield teas of the highest quality and the most delicate flavor and contain more soluble matters than the older leaves. Black teas contain less theine, essential oil and tannin than green teas.

Exhausted or spent leaves and leaves which have been accidentally damaged by water are often re-dried, gummed and faced with coloring matter. Such teas, as well as those adulterated with mineral matter and the leaves of other plants, are known in China as "lie" tea.

Tea as a beverage has but little actual nutritive value, but it increases respiratory action and excites the brain to greater activity. The stimulating effects of tea on the nervous system are due to the essential oil and the theine, the tannin is an astringent.

Tea is soothing to the nervous system; it increases the action of the heart, lungs and skin and enables the body to resist the depressing effects of exposure and fatigue.

Tea is woman's great beverage, since by its mildness and by its peculiar nature it is the best of all adapted for her fine organization. It is for women what tobacco is for men.—*New York Mail.*

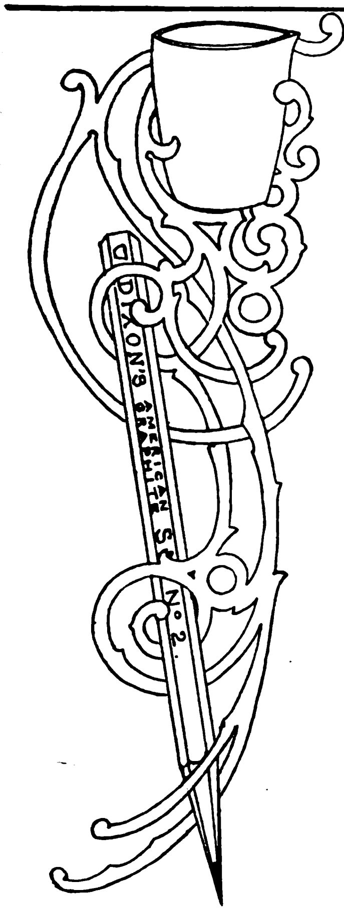
*Our readers may be comforted in knowing that plumbago and blacklead are only other names for graphite, and that graphite is as pure, sweet and healthful as charcoal. Graphite, like charcoal, is a form of carbon.

A LADY tells us that she heard a colored preacher say: "De fo' part of de house will please sit down; fo' de hind part cannot see de fo' part if de fo' part persist in standing befo' de hind part, to de utter obsclusion of de hind part by de fo' part.—*Christian Advocate.*

Graphite.

VOL. IX. FEBRUARY, 1907. No. 2.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



GRAPHITE FOR AUTOMOBILE CHAINS.

Dixon's Ticonderoga Flake Graphite is recognized the world over as a most desirable lubricant. In the lubrication of automobile chains it occupies the first position as a lubricant, and in general a lubricant is not gotten up for chains without having graphite incorporated in it.

The advantage lies in the fact that the grease and graphite get to the innermost parts of the chain, thus insuring perfect lubrication of the pivots and links and also keeping out the dirt and grit.

Professor Forrest R. Jones, who was at one time Professor of Machine Designing at Cornell University, writes in the *Sibley Journal* for October, 1906, under "Automobile Operation" that "in the use of chains, especially in the double chain drive, the chain running on the spocket wheel attached to each gear wheel, the chain is constantly subject to dust and mud. The wonder is that it lasts so long and performs its services so well, even with all its protesting noise."

Again later in this article he says: "The common practice is to lubricate it with oil and graphite grease more or less regularly." We have no doubt Prof. Jones had in mind Dixon's Graphite Chain Compound, which is recognized as the best lubricant for chains.

The compound is melted, and the chain having been previously cleaned, is dipped into the molten mass. In this manner the grease and graphite get to the innermost parts of the chain. The chain should then be hung up to dry and before using should be wiped off with a cloth to get rid of excess grease.

Those who do not wish to go to the trouble of removing the chain and dipping it into the molten mixture can use for a very good substitute Dixon's Graphitoleo, which can be applied direct to the chain, though it doesn't work into the chain as well as the Motor Chain Compound.

THERE IS A REASON.

The value of graphite as a lubricant depends quite largely upon the kind of graphite used. All pure graphite is good to a degree, but flake graphite is preferable, and there is a reason why.

AUTOMOBILE CLUTCHES.

The clutch will sometimes be found to stick or act fiercely. This is usually caused by the frequent practice of "slipping" it, in order to mount hills on a higher gear than the car is really capable of. This method is very bad practice, and one often indulged in by men who ought to know better. If taken in time, the trouble can be removed by carefully cleaning the clutch-leather with gasolene. When this is done, and the leather is dry, pour hot linseed oil in, and let it soak for some time. Keep adding more oil, as the leather absorbs it. Never under any circumstances put resin, paraffin or compounds on the clutch, either to make it slip or stick. The best way to make a clutch slip is to slack the spring, and the best way to make it grip is to tighten the spring. It may, of course, be possible that the leather has become saturated with lubricating oil. In this case, a little French chalk shaken lightly on the leather will be found to do all that is required, but very little should be used, as it cakes on the leather, making a hard surface.—*Automobile Topics.*

One of the best things, if not the very best thing, for preserving the life of leather, for making it waterproof and keeping it at all times pliable, is Dixon's Traction Belt Dressing, which comes only in paste form. This particular dressing is known in both Europe and America, and has been in use for twenty-five years and longer.

Mr. John A. Walker, of Jersey City, Vice-President of the largest graphite product house in the world, is in Washington as a delegate attending the national convention for the extension of foreign commerce. His company has officers in all the large foreign cities in the world, and their representatives visit all the Oriental countries. The company has foreign representatives in London, Paris, Amsterdam, Vienna, Brussels, Berlin, Milan, Warsaw, Copenhagen, and Finland, and is well represented in South America.

Mr. Walker states that the present tariff of the United State has in no wise hindered his concern from doing business in all parts of the world, and the success it has made in this direction has been due to the fact that it has sent competent representatives to visit these countries, who have personally found out the needs and met conditions as they found them.

—*Washington Post.*

The demonstration of the Dixon Company at its booth at the Automobile Exhibit at Madison Square Garden, New York, January 12–19, proved the great value of Dixon's automobile lubricants.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

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GRAPHITE MINES AND MILLS AT TICONDEROGA, N. Y.
CEDAR MILLS AT CRYSTAL RIVER, FLA.

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E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., February, 1907.

JOHN A. WALKER APPOINTED STATE DELEGATE.

By the Governor of New Jersey to Represent New Jersey at the National Convention in Washington for the Extension of the Foreign Commerce of the United States.

Mr. John A. Walker, the Vice-President and General Manager of the Joseph Dixon Crucible Company, was appointed by Governor Stokes as the representative delegate from the State of New Jersey to the National Convention for the extension of the foreign commerce of the United States, held at Washington, D. C.

The convention commenced on January 14th, and further accounts, written by Mr. Walker himself, will appear in GRAPHITE for March.

Mr. Walker was one of the ten delegates composing the state delegation, and the honor conferred is a high one and appreciated by Mr. Walker. The honor was conferred by Governor Stokes because of Mr. Walker's well-known reputation and ability, and because as Vice-President and General Manager of the Joseph Dixon Crucible Company, whose goods go to all parts of the world, it was thought that Mr. Walker would be an especially fitted representative.

DIXON'S publications sent free upon request.

EARN THE MONEY YOU NEED.

"It is a safe deduction so far as I know," says Mr. John A. Walker, Vice President and General Manager of the Joseph Dixon Crucible Company, "that money a man doesn't earn does him more or less harm, even money left by parents to children is dangerous to some." These remarks are drawn from Mr. Walker by the statement made in the daily papers that Prof. Sir William Japp Sinclair, of Victoria University, Manchester, in a speech at Aberdeen, voiced the numerous severe complaints of the evil effect of Andrew Carnegie's gift of $10,000,000 to the Scottish universities. He said that he had never met an Aberdeen graduate who did not denounce the influence of the gift.

It is learned from other sources that the provision whereby any Scottish student may apply to the Carnegie Trust for fees has been interpreted with such latitude that even some colored students have received aid. The practical effect of the gift was that a majority of students at all the Scottish universities had drawn fees from the trust fund, many of them squandering the money supplied by their parents and concealing the fact that they received help from the fund.

It is also asserted that the university professors, in view of the students receiving these donations, have raised their tutorial fees and become less earnest in performing their duties. It is declared that the Scottish student is losing his self-reliance and capacity for study under difficulties and that the whole nature of Scottish university training is undergoing a change for the worse.

THE SPOTTED MAN.

The Adhesiveness of Flake Graphite Shown in an Amusing Manner.

The representative of the Dixon Company at Copenhagen writes us of an amusing instance which happened there in a bathing establishment, and which our agent considered proved what we have written so often in GRAPHITE: that people should use graphite in limited quantities and that flake graphite is peculiarly adhesive.

The bather complained to the management of the bathing establishment that after the bath and coming out he was covered with black specks which he had the greatest difficulty in removing from his body, and that when he attempted to rub them off they left black streaks behind them.

On investigating the matter carefully they found that the machinist had used graphite for lubricating the water meter, a large water meter which gauges the water from the water works to the establishment. The machinist had put into this water meter a cup full of graphite instead of a little in connection with grease or oil. The flake graphite had passed along into the water from the meter, and it was Dixon's Flake Graphite which so thoroughly covered the bather and which persisted in clinging to his skin. As the man expressed it, he went in a reasonably clean man and came out in a "nigger-like state." The Dixon representative writes that this is no exaggeration, as the engineer told him the story himself.

Remember, as we have explained from time to time, that the function of graphite as a lubricant is quite different from that performed by oil.

AN ELECTRIC DRIVEN RECEIVER PUMP.

By W. H. Wakeman.

The single acting power pump is a familiar sight to almost every engineer, and as it is very simple it is generally understood, for as the plunger ascends it draws water in through one check valve while the outlet is kept closed by the same action. When the plunger begins to travel downward the inlet valve is quickly closed, and the outlet opened and the water is forced to the boiler against any reasonable pressure.

In order to make such a pump double acting it must be much more complicated, but the fact that its capacity is doubled by the additional parts, compensates for the added complication.

A plunger is nearly always used for a single acting power pump, but when it is made double acting it becomes necessary to use two plungers, or else adopt a piston, and the latter is chosen.

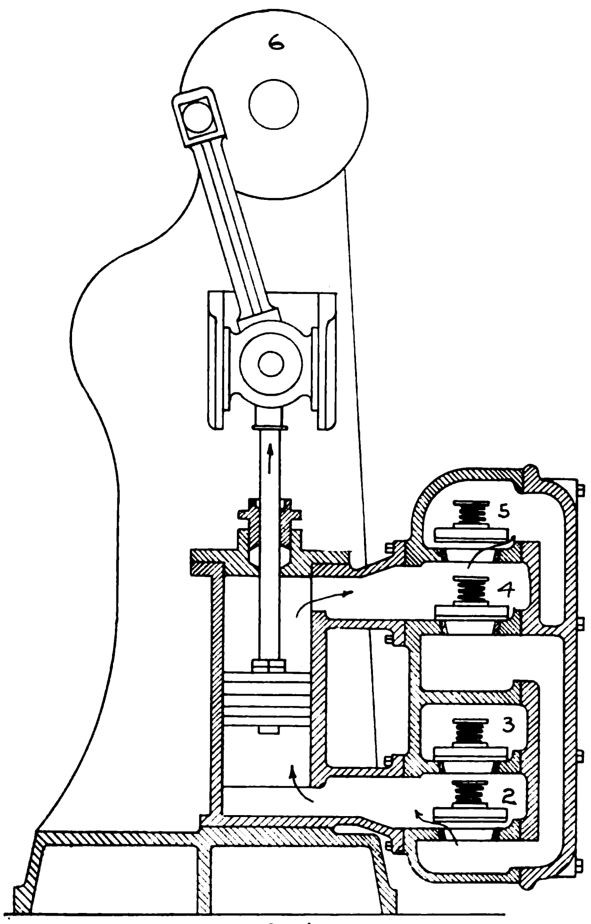


Fig 1.

Fig. 1 is a sectional side view of a triplex power pump, in which the piston is ascending. This action draws water in through the valve *2*, but holds *3* closed firmly. At the same time *4* is also closed on the upper side and water is going out through *5*. When the disc crank *6* has made one-half of a revolution the piston will be descending, then *5* will be closed while water comes in through *4*. At the same time it will pass out through *3* and *2* will be closed. As this action is repeated indefinitely water flows into and out of the pump in a continuous stream, for although there is a pause while this crank is passing either center, there are two other pistons forming this pump and both are delivering water while this one is passing each center, therefore the discharge is continuous.

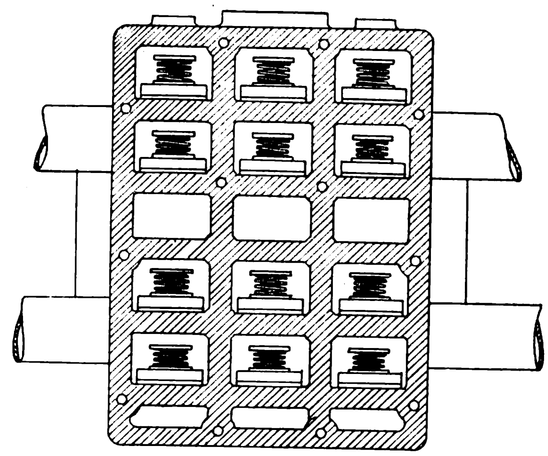


Fig. 2.

Of course it requires a comparatively large number of valves, as each piston must have at least four, therefore a triplex pump must have not less than twelve to make it double acting as shown in Fig. 2.

Such a pump can be used for any purpose to which a power pump is adapted, but the object of this article is to show its application to the service of a steam heating plant, in returning water resulting from the condensation of steam to the boilers automatically, when driven by an electric motor.

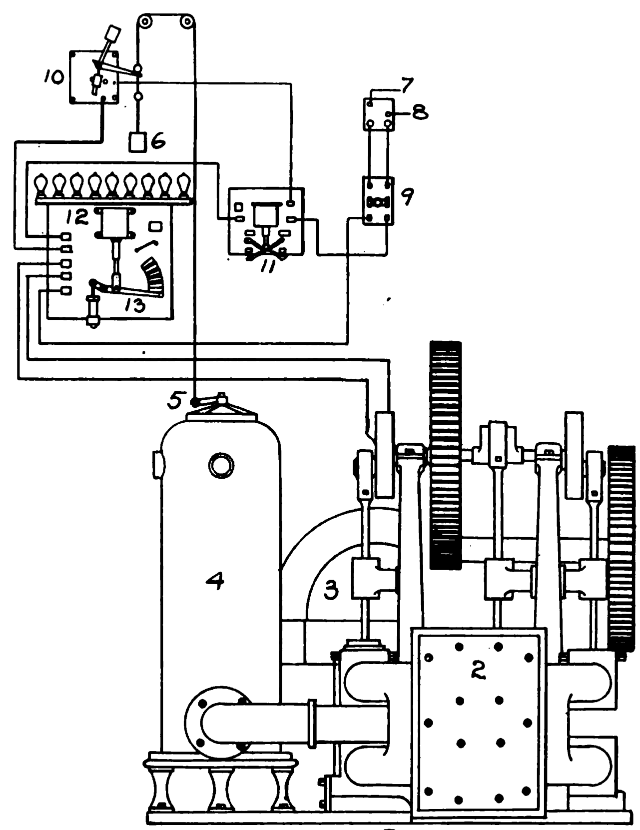


Fig. 3.

In Fig. 3 the double acting triplex pump is shown at *2* while the motor is behind it at *3*. Returning water flows into the receiver *4*, in which is a float that rises and falls with the water level. It operates the lever *5*, to which is connected a small wire cable that passes over two pulleys and supports the weight *6*. Electricity comes in and goes

out over the two main line wires *7* and *8*, passing through the main line switch *9*, which is now open, but is closed when the pump is in operation.

When the float in the receiver rises, it throws in the float switch *10*, which causes current to circulate through the automatic switch *11*, which in turn sends it through the solenoid *12*, which operates as a magnet, and draws the lever *13* upward the same as when a lever on a motor controller is slowly moved over the segments of a rheostat by hand in the process of starting a direct current motor. The effect of this action is to gradually turn current on to the motor, causing it to start quietly without shock or jar.

When enough water has been pumped out to lower the water level in the receiver *4*, the float falls, carrying the lever *5* with it and this throws out the float switch *10* which shuts off current from the automatic switch *11*, and this deprives the solenoid *12* of its power, therefore the lever *13* drops back into the position shown and the pump stops, remaining stationary until enough water collects to raise the float, repeating the above described operation.

There are many places in which such a pump and receiver can be installed, where other pumps would not be effective. For illustration take a low pressure steam heating plant where some of the apparatus is below the boilers, making it impossible to return the water of condensation by gravity. This pump and receiver can be located in such a plant down low enough to allow all water of condensation to flow to it, and by taking current from the street service it can be operated to keep the entire system free from water at all times.

Even in high pressure heating plants it may be used to good advantage, for although receivers in such plants are usually relieved of water by direct acting steam pumps operated by high pressure steam taken before it is reduced for heating, still this steam must be conveyed long distances, which means that the loss by condensation is heavy. There is some loss of power in generating electricity and transmitting it to different parts of a plant, but this is made manifest in developing more power at the engine, thus giving more exhaust steam for direct use, and this seems more consistent than to waste it in condensation where it does no good.

As the solenoid acts an important part in operating this ingenious device, an explanation of the principles which cause it to do the required work, should prove interesting.

A magnet is an attractive body that has north and south poles.

It attracts other bodies or parts of them that have opposite poles and repels similar poles. This force is exerted continuously until the magnetism is exhausted, when it becomes useless until again excited.

A solenoid is a magnet that attracts bodies in the same way, but only when electricity is passing through it, hence it is available for use in connection with motor starters as above described, for when current is turned on the coil shown in Fig. 3, it has north and south poles which may be determined as follows: Take a piece of wire and wind it into the form of a helix (see Fig. 4), but what is more commonly called a coil although this is not correct, then hold it so that you will look directly through it as if it were a pasteboard tube, or in other words along the line of its center or axis, and imagine that an electric current is passing over the wire. If it travels in the direction taken by the hands of a watch,

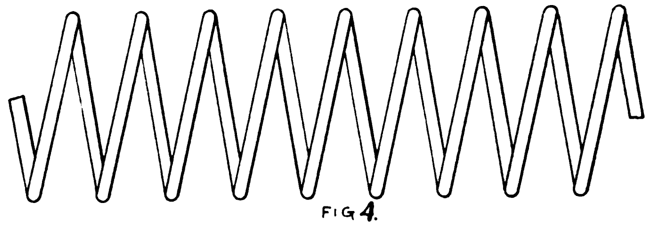


FIG 4.

or "clockwise," as it is sometimes called, then the south pole is nearest to you and the north pole is at the other end. If the current travels in the opposite direction the poles are reversed from the above location.

Another way of explaining this action and result may be preferred by some readers, and be more satisfactory. Take an ordinary iron bolt with a right hand thread, and set it on

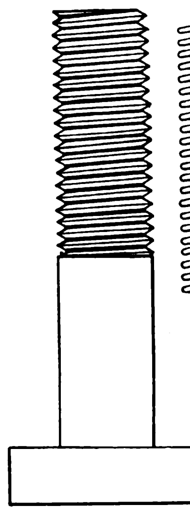


FIG.5

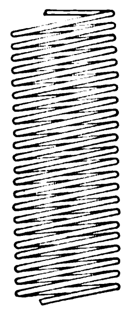


FIG. 6

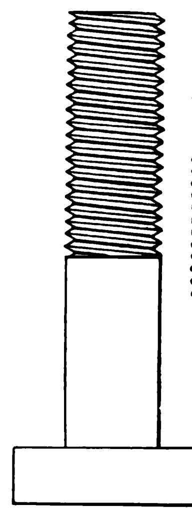


FIG.7

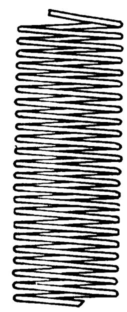


FIG 8

end as shown in Fig. 5. Now wind a copper wire between the threads and then unscrew it. The result will be a right hand solenoid as shown in Fig. 6. Next send an electric

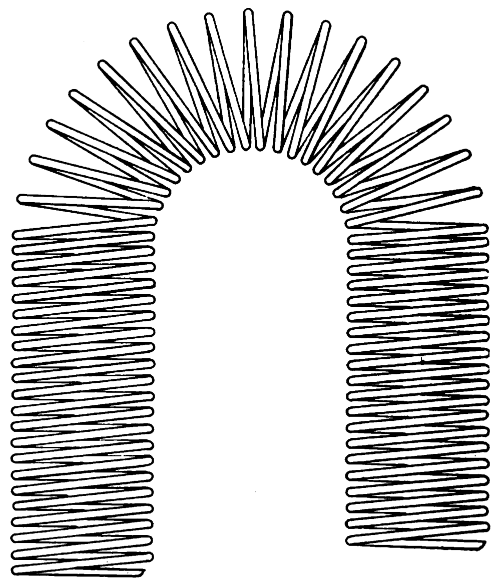


FIG. 9

current over the wire starting at the top and coming out at the bottom. Under these conditions the south pole is at the

top and the north pole at the bottom. Of course, the same result will also be secured if the coil is held in a horizontal position.

As a further illustration take another bolt and set it on end as shown in Fig. 7. This bolt has a left hand thread, therefore when a copper wire is wound between these threads and unscrewed as before, its appearance is illustrated in Fig. 8 and we have a left hand solenoid. If an electric current is sent from the top downward over this wire, the north pole will be at the top, and the south pole at the bottom.

As a further demonstration take a copper wire that is well insulated and wind it into the form of a long right hand solenoid, then bend it into an U shaped magnet as shown in Fig. 9. As one pole is north the other must be south. In practice we would not continue the winding through the central part but would carry a curved wire from one part to the other as shown in Fig. 10, thus giving the usual form of solenoid.

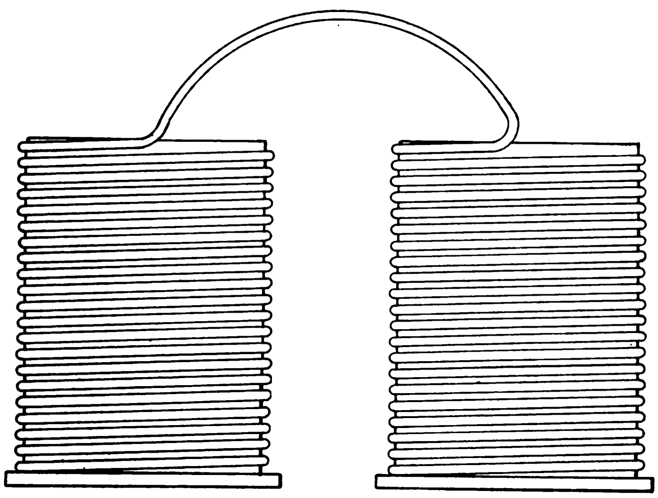


FIG 10

As already explained, a solenoid is a magnet while an electric current is passing through it, and this explains the action of the solenoid illustrated in Fig. 3 at *12*, for when *10* is thrown in, it sends current through *12*, causing it to act as a lifting magnet, drawing the lever *13* upward and slowly starting the motor *3*. All such motors should be fitted with Dixon's Graphite Brushes in order to secure the best possible service with these machines.

AGAINST USE OF WHITE LEAD.

(From the European Edition of the N. Y. Herald.)

Referring to a measure now under discussion by the French Senate tending to prohibit the use of white lead by painters, decorators and industrial undertakings, the *Petite Republique* advocates total prohibition and opposes half measures. It says: "White lead is a poison. Those who argue the contrary are not only of bad faith, but are absurd. Now it is not normal to allow a poison to make each year hundreds and thousands of victims. It might be excusable if it were impossible to do otherwise, but seeing that the method of avoiding the evil is now known there can be no hesitation. Half measures, though they may constitute an improvement, must be regarded as criminal."

PAINTING BRIDGES IN WINTER.

The following article was written by a foreman painter of one of the large railroads of the United States. This gentleman has had an experience of many years in painting railroad bridges, under all kinds of conditions, and the subject of this article, "Painting Bridges in Winter," is of special interest at this time:

That experience is a good teacher, no one will deny, and after repeated warnings by different authorities on the increased cost of labor and material and the lack of durability from painting metal in the winter months, let us recall our experience of six years.

In January 1901, a large railroad system sent a gang of painters into western Iowa to clean and paint fifty steel girder span bridges. With the force at hand, and owing to other conditions of the work, they were twenty months completing the work. During this time they were painting through the winter months of 1901 and 1902, as well as through the summer months of both years, and every precaution was taken not to paint when there was moisture in the air or when frost was on. The paint was applied on girders in February 1902, when the thermometer registered as low as 4° above zero, and there seems to be no difference now in the general condition of this work, whether it was painted in summer or winter.

At no time did the work over-run the estimate of cost, although the cost was slightly increased both for labor and material in the winter. However, this extra cost was only a trifle as compared to the care of the structures, and now after more than five years it is impossible to tell whether the structures were painted during the summer or the winter, as the general conditions are the same, and only by looking at the date painted on when finished can you tell when the work was done.

All of these bridges received exactly the same treatment, having first been coated at the factory with boiled linseed oil, which was only a detriment to the surface. The oil bound fast the mill scale, rust, grease and blisters and in the field, without a sand blast, could only be removed by hand scrapers. After the steel was erected it received two coats of paint.

The condition of the work had several advantages, by having a land climate without alkali, sea fogs or gases, which are enemies to paint; yet it has had the disadvantages of being painted in many cases, six months after erection, the coating of linseed oil and the drippings of salt brine from meat refrigerator cars.

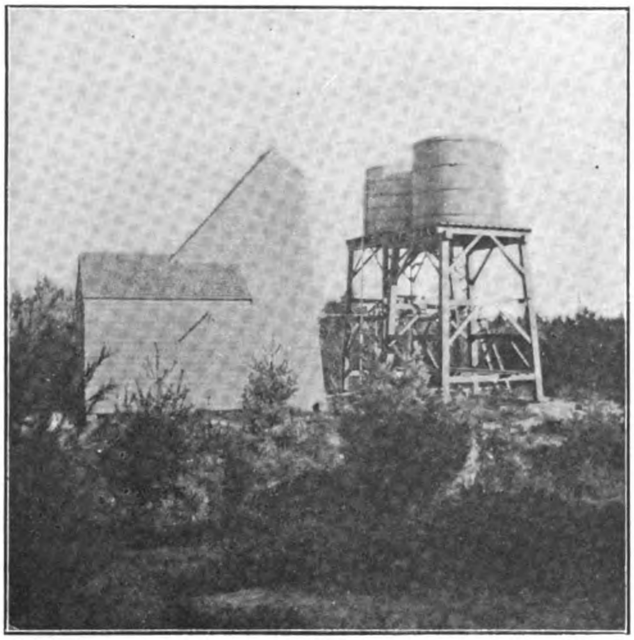
After experiences of this kind which may occur over and over again, it only convinces one that the time to paint is just as soon as the structure is erected and before rust starts. Like filling the purse, "Little and Often" makes a good rule for painting, and the season of the year cannot be considered when a structure needs paint.

The Joseph Dixon Crucible Company are miners, importers and manufacturers of graphite of all kinds, and therefore the Dixon Company are prepared to furnish all grades of amorphous, flake, and foliated graphite.

With an experience of nearly one hundred years in acquiring data on the subject the Dixon Company is specially qualified to advise on the use and value of the different graphites.

PUMPING STATION.

The excellent qualities of Dixon's Silica-Graphite Paint as a protection for iron and wood work have made it very desirable for use on water tanks. While a cheap paint may for a short time keep the wood in fair condition, the vital part, the iron work, by rapidly rusting, points out the serious results of using poor material.



PUMPING STATION, MAINE COAST.

The above illustration shows the pumping station of a summer colony on the Maine coast. For over four years the wood and metal work of these tanks and building have been protected with Dixon's Silica-Graphite Paint, Olive Green. Recent examination proved the paint to be in absolutely good condition. There was no sign of peeling or cracking on the wood work, and the metal was free from corrosion and perfectly protected. The paint will apparently last many years longer. This pumping station stands on a high elevation fronting the open ocean. It is exposed to the sun and rain storms of summer, the sleet storms and fierce gales of winter, and throughout the seasons comes the salt air from the sea which so quickly causes corrosion and the deterioration of metal having inadequate protection.

"LIKE THE KIPPLING AND THE DICKENS."

The proprietors of a Siamese newspaper have distributed handbills containing the following notice:

"The news of English we tell the latest. Writ in perfectly style and most earliest. Do a murder, git commit, we hear of and tell it. Do mighty chief die, we publish it, and in borders of somber. Staff has each one been colleged, and write like the Kippling and the Dickens. We circle every town and extortionate not for advertisements. Buy it. Buy it. Tell each of you its greatness for good. Ready on Friday, Number first."—*The Bangkok Times.*

With the seedless fruit and the wireless telegraph we now have the stingless bee. Gee, what next?

GRAPHITE ANTI-FRICTION METAL.

Various attempts have been made to produce an anti-friction metal that will contain graphite. Some time ago a metal was marketed under this name, but it contained no graphite. It was simply a lead and antimony alloy containing twenty per cent. of antimony. The fracture of this alloy is coarse and black and somewhat resembles graphite.

Recent attempts have been made in Germany to produce an anti-friction metal which actually contains graphite, and while it seems to have been accomplished, the usefulness of the product is a matter of doubt. The method used is as follows:

A mass of coarse grains of graphite are imbedded or held in a mold and a layer of copper is deposited over them by means of the electric current and the regular acid copper plating solution. The fact that copper is a good conductor of electricity permits this to be done. Another layer of graphite is now placed on the surface and the copper again deposited over it. This is repeated several times until a thickness of metal is obtained which will serve for anti-friction purposes. Among the uses mentioned for this anti-friction metal is the manufacture of dynamo or motor brushes.

—*Brass World.*

Dixon Manager—"I suppose your husband finds it difficult to catch the morning train to the city?"

Mrs. Suburban—"Not at all; but he finds it difficult to catch the evening train from the city."

THE DIXON ADVERTISEMENT IN DEATH VALLEY.

A correspondent at Lone Pine, California, sends us his check for $1.50 and asks us to kindly send him as many "Eterno" pencils as that sum will buy. He encloses an advertisement of the Dixon "Eterno" pencil, and adds that he found this advertisement in an old magazine in a deserted camp in Death Valley.

Miss Primer—"Why did you discontinue buying school supplies from Dixon?"

Miss Grammer—"Because he said recently that I was one of his oldest customers."—*School Board Journal.*

A POLYGLOT POLICEMAN.

A New York policeman, who speaks nine languages, says the day is coming when every policeman in our large cities will be able to converse in two or three modern tongues. The advantages would be obvious in the police management of mixed foreign populations. However that might be, the fact that a policeman of average intelligence who, when he went on the force a few years ago knew but three languages, has succeeded in acquiring six others, while busied with his exacting daily duties, shows how easily languages may be learned by one who sets his mind to the task in earnest. A moderately apt young woman should be able to acquire a working knowlege of French, German, Spanish, Italian or any other of the living languages by devoting a half hour a day to its study for a year. Thus in five years an industrious student should be able to acquire five new languages. Both as a means of culture and from a utilitarian viewpoint the study of languages is most useful.

The above is from the *Evening Journal* of Jersey City, and it will remind the readers of GRAPHITE of the repeated statements of Mr. John A. Walker, that every man should be able to make himself understood to speak with more or less fluency one or more languages other than his own.

LUBRICATING GREASE.

And the Benefit That Comes From Having Flake Graphite Mixed With It.

An English writer says that it is a good idea to have a grease in which there is graphite. If the grease melts, and it must melt in order to lubricate, the graphite prevents excessive friction and wear. When a bearing has become hot and cannot be lubricated with either grease or oil, graphite will prevent the fatal seize.

LUBRICATION FOR MINING MACHINERY.

There is probably no factor, says the *American Exporter*, that has a more direct bearing on the cost of production per ton of coal or ores than the lubricating of mining machinery, and yet it is doubtful if there is another item connected with the operation of a mine less understood by owners, their managers and superintendents in charge.

The mechanical installation is of the highest known efficiency, everything is done in the equipment of a plant to secure economy in its operation. After all this is done, frequently a long step is taken in the opposite direction by the use of a lubricant unsuited to the existing conditions. The office of a lubricant is not merely to secure quiet running of engines and machinery with temperatures of the bearing not alarmingly high, but, primarily, to reduce friction and wear to a minimum, and a lubricant that will do this is the best to use, no matter what the price may be.

Few realize the great loss in power due to the friction of wearing parts; it may probably be fairly estimated that one-half the power expended in the average case, whether in mill, mine or workshop, is wasted on lost work, being consumed in overcoming the friction of lubricated surfaces, and a reduction of fifty per cent. in the work lost by friction has often been secured by a change of lubricants.

Among the expenses chargeable to waste power, due to inferior lubrication, may be included: (1) the cost of power produced in excess of that really required to operate the mine per ton of output; (2) wear and tear on machinery, which is constantly doing more work per ton of coal mined than should be required of it.

It is most difficult, in an article of this character, to do more than point out the danger due to the use of inferior lubricants, there being so many substitutes placed on the market with a schedule of laboratory tests which are useless and misleading to anyone other than a manufacturer of lubricants, who makes use of them merely as a means of insuring uniformity in his manufactured products and not as a measure whereby to judge their practical value.

WHERE PENCIL MARKS WERE NOT LEGAL.

George W. Collard, who was about eighty years old when he died, married his housekeeper about four years before his death. He made his will to provide for her liberally, but when he learned she had a husband in the West from whom she had not been divorced he drew pencil lines through the bequests which he made for her.

Judge Ten Eyck, in the Essex County Orphans Court, in Newark, N. J., decided that the erasures made with a lead pencil, though made by the testator himself, could not be considered, and ordered that the will be admitted to probate in its original form.

POSITIVE AND COMPARATIVE.

Man's words to man are often flat,
Man's words to woman flatter.
Two men may often stand and chat,
Two women stand and chatter.
—*Catholic Standard and Times.*

MICA AS A LUBRICANT.

"The properties of mica as a lubricant are not very well known, owing to the fact that it has only been used for this purpose during the past few years.

Mica as it occurs in nature is full of flint and foreign substances, but when these impurities are taken out by a process known as air flotation, only the pulverized pure mica remains.

It is used for cooling hot bearings and on machinery in hot places, such as laundries and rolling mills. When used in cylinders, the mixture of mica and oil is fed through the lubricator in the ordinary way. It is also being used for high speed ball-bearing machinery.

It does not discolor the oil with which it is mixed, which allows the oil to be filtered. When used on a bearing, after the oil has been used up, the mica still remains and as it does not cake or harden, it leaves the surface of the bearing in a smooth and glossy state."—*Practical Engineer*, October, 1905.

Graphite and Mica.

Mica is offered as a substitute for graphite. The man who accepts and uses mica as a substitute for Dixon's Flake Graphite will very likely some of these days buy neatly packed sawdust as a substitute for oatmeal or hominy.

In a pretty package clean, finely ground sawdust really looks quite edible. It is soft and clean to handle, it looks attractive and every bit as nourishing as oatmeal or cracked wheat. It could easily be boiled, it would go down smoothly with sugar and cream, but what might it do after that?

Now, nicely ground, flaky mica is soft to the touch, it is cleanly to handle, it doesn't undergo changes when exposed to heat or moisture, and if you put it between two heavy surfaces it will probably make them slide pretty smoothly.

But—what will it do when it gets in an engine or machine bearing?

What will it do when it gets in a cylinder or valve?

Will you take the risk of doing what other engineers do not dare to do?

Will you disregard scientific theory and practical experience because the evident reason wasn't written across the surface of things?

Would you eat sawdust in place of oatmeal?

Flour emery is soft and smooth, soapstone and ground orris are smooth, some graphite is smooth and yet will be fully half clay. No, siree! smoothness and softness is not alone a sufficient proof of lubricating value. Castor oil, olive oil, soft-soap and a lot of other substances are fine lubricants so far as the "feel," the smoothness and slipperiness goes, but where could be found an engineer in full possession of his senses that would use any one of them in a cylinder?

There are graphites offered for lubricating that would fool an expert on appearances, for a little of the pure stuff will color and polish a lot of impurities. The chemist's crucible is the only sure test of the purity of a graphite.

The only safe way to buy lubricating graphite is to buy of a reliable firm. If you go experimenting with cheap stuff offered for "every bit as good as Dixon's and much cheaper," you may be laying up trouble for yourself that will make you repentant of your economy.

And so it is with flake graphite and flake mica. Eat the sawdust if you like, but if you do get ready to lay off for extensive repairs to your system.

Why do engineers feed Dixon's graphite on to a bearing or into a cylinder? To get that smooth, glossy polish on the surfaces that lowers friction, cures friction troubles, saves oil, saves wear and repairs.

Won't mica also impart that polish? Not possibly. If you doubt it rub a little mica between your fingers and then a little fine flake graphite and note the difference.

What would happen if you did use mica? We won't undertake to predict, but if you do insist on trying it for goodness sake have the Dixon graphite can handy to repair the damage to bearing or cylinder before it's too late.

How do we know all these things? My dear sir, we've been in the graphite business for over eighty years, and we've records of the meteoric rise and fall of more lubricating schemes, new lubricating formulas, graphites, micas and all, and Dixon's Ticonderoga Flake Graphite is still the best of them all, the only one that ever made good in the eyes of engineers in all civilized countries the world over.

The "survival of the fittest" is an unfailing law of nature. Mica's nothing new, bless you. It's good points have long been recognized, but it simply hasn't "made good," and graphite—Dixon's Flake Graphite—has.

Now, we put up a sign, "Fresh Paint," so that you won't get yourself in trouble through ignorance. Now, are you really going to rub your finger on it just to see if we're telling the truth? Go ahead then, but you'll surely have to wash your hands.

HE KEPT A STEAMBOAT RUNNING.

A number of interesting letters come to our attention and we are reproducing one which shows how Dixon's Ticonderoga Flake Graphite made it possible for a man to keep a steamboat running when the owner was about to discard it:

EAU CLAIR, WIS., Dec. 18, 1896.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Dear Sirs:—I received the booklet O. K. and am pleased with it. You can send the other literature and I will be pleased to read the same.

I give you some of the experiences I have had with your graphite as a lubricant. I got a berth on a small steel steamer to ply on the inland lakes which a stage company bought of the lakes to take off nine miles of hard drive. They had five different engineers to run the boat for them, and some of them with a steamboat license (I have no license), and they could not run it. I was the sixth man they had and the owner was about to give it up until I came along and put them Johnny Wise.

I made a short trip and seemed to be O. K., but it took one hour and thirty-five minutes to run eight and one-half miles across the lake, and I made it in forty-five minutes after I used your graphite in the bearing and in the cylinder.

We had the boat loaded down at the dock (a dangerous load) and the other engineer had to stop and check down to run the Penberthy injectors in order to get water to the boilers, which I never did in my life.

I offered to buy my own graphite lots of times, as some owners say that they will not pay twenty-five cents a pound for it, and I told them it is worth fifty cents a pound.

Yours very truly,
FRANK D. HARRISON.

IS THE SUM HARD TO DO?

And Did the Boy Have It In for the Man?

A school boy who had been more or less tormented by his father about his small amount of knowledge of arithmetic brought home one day the following problem and asked his father to help him do it:

From one mile, subtract 7 furlongs, 39 rods, 5 yards, 1 foot, 5 inches.

	Mile.	Fur.	Rods.	Yds.	Ft.	In.
From	1	0	0	0	0	0
Take	0	7	39	5	1	5

If the boy was able to do it he did not let his father know it, but he knew enough to make a good deal of trouble for his father, and to get himself in trouble in the end.

For the benefit of our readers who have forgotten their tables we will say,

12 inches	make	1 foot
3 feet	"	1 yard
5½ yards	"	1 rod
40 rods	"	1 furlong
8 furlongs	"	1 mile.

Now try it yourself.

REFLECTION OF SUNLIGHT IN MINE SHAFT.

Due to Dixon's Graphite.

In GRAPHITE for August, 1906, there appeared a paragraph taken from a New York paper in which it was stated that the rays of the sun reach to the bottom of a two thousand feet deep shaft at Sombrerete, Mexico. This is due to the fact that the town is on the Tropic of Cancer and at meridian, on June 21st, the sun's rays fall vertically, so that the mine shafts are illuminated to the lowest depths.

The illumination lasts about three minutes. It makes the shaft so light that a person standing over the shaft can discern small objects on the floor of the two thousand foot shaft. In three minutes the sunlight disappears for a year.

On reading this paragraph a gentleman interested in the matter wrote us that for ten years or more the shaft ropes at this mine at Sombrerete, Mexico, have been kept in perfect condition by means of Dixon's Graphite Waterproof Rope Dressing.

They are flat ropes, some of them as wide as eight inches, "I think," writes this gentleman, "that the graphite keeps them so bright that the light is reflected by the whipping motion of the rope going up and down during noontime of every summer day of the year. I observed this while at Sombrerete Camp in 1896."

THE LEAD OF A LEAD PENCIL AND A COPPER ROOF

Catch Wireless Messages.

According to the *Cleveland Enquirer*, Father Odenbach, head of St. Ignatius College, Cleveland, has discovered a method whereby he can intercept wireless telegraph messages by means of the copper roof on the college, some steel pins and the lead of an ordinary pencil.

While listening to the sounder connected with the ceronograph on the top of the college, by which lightning is recorded, Father Odenbach, who had substituted the lead pencil and pins for the usual expensive coherer in the instrument, heard the sounder tick off some Morse code characters. Investigation showed that he had intercepted messages received at the Clarke Wireless Telegraph Company's station, Cleveland, which came from the Detroit office.

At first the scientist did not understand the message, but he studied the code and finally was able to detect a few letters. Later he called in a telegraph operator, and the latter was able to take the message. It was found that the copper roof of the college, on which are stationed several weather recording machines, was a much better receiver than the poles and wires used at the regular wireless station.

The lightning recording instrument is so arranged that the sounder in the laboratory connected with the machine on the roof ticks when lightning flashes. It was through this machine that wireless messages were obtained. The regular stations use coherers that are very expensive and need constant attention, and Father Odenbach's discovery of the lead pencil-pin method is deemed important.

In connection with the above interesting article it may be worth mentioning that the Dixon Company have for some time manufactured for the Alphans Custodis Chimney Construction Company graphite points for their lightning rods.

FROM AN AIR-BRAKE MAN.

THE following letter was received from an air-brake man, and we are printing the same to show how the practical and experienced man feels about Dixon's Air Brake and Triple Valve Grease, and are sure that there are a great many of our readers who perhaps feel the same about it. We regret that we are not able to publish the writer's name in connection with the same:

"At one time you sent me a sample, and I can honestly say without fear of contradiction that it is the best I have ever used as a lubricant for the rotary valve of the engineer's brake valve. Our winters in this climate are not so very severe, still I have no hesitancy in saying that your Triple Valve Grease cannot be equaled, for I have tested it as far as triple valves dare to be tested, and as I cannot force this company to purchase the grease for me, I therefore kindly ask you to give me your price on 5-lb. cans. It makes my work lighter on me and gives better satisfaction to the engineer in handling brake valves and triple valves. Also give me price of Special Graphite, No. 635, for air pumps.

"You understand that I have that much confidence in your Grease and Special Graphite that I am willing to go down in my pocket and purchase it for my own benefit, as well as for this company's."

DIXON'S AIR BRAKE AND TRIPLE VALVE GREASE.

More Good Words Concerning Dixon's Triple Valve Grease and Flake Graphite from a Practical Railroad Official.

Following our usual practice, we omit name and place at the desire of the official, but have pleasure in printing the following:

"I have used Dixon's Air Brake and Triple Valve Grease, and find it leaves nothing to be desired. After the sample was used I had the General Storekeeper order me some of Dixon's, but I am always sent some other. I don't know what the matter is, whether the office has difficulty in getting it or not.

"I may add that we are using Dixon's Flake Graphite here, and I have always used Dixon's Graphite in the air pump and engine valves, and in the five years I have been here we have never had a cut rotary, and I find there is nothing better for hot pumps than your graphite, and certainly our air pumps have very hard service."

The Dixon Company has much pleasure in saying that after the receipt of this letter there came a requisition from the same railway company for a supply of Dixon's Air Brake and Triple Valve Grease.

AS LONG AS HE DOES PIPE FITTING

he will use Dixon's Pipe-Joint Compound. One of the Dixon customers adds to his letter: "I am still using Dixon's Graphite Pipe-Joint Compound. I have had the usual amount the past season, and certainly expect to use it as long as I do pipe fitting."

DIXON'S graphite publications are sent free to anyone upon request.

MOLYBDENUM.

As samples of molybdenum are frequently sent to the Joseph Dixon Crucible Company under the impression that they are graphite, we think that the following from the *Brass World* may prove of interest to our readers.

"Molybdenum is one of the semi-rare metals. It exists in nature as molybdenite, a sulphide of molybdenum. This molybdenite resembles graphite in appearance, as it occurs in black flakes which leave a mark on paper. It is not as greasy, however, as graphite. When this sulphide of molybdenum is roasted, the sulphur is driven off and a trioxide of molybdenum left. Trioxide of molybdenum is a yellowish white powder, and is used in chemistry for the determination of phosphorus in steel or other metals. It possesses the property of forming a combination with phosphoric acid and producing a yellow precipitate in a solution which contains it. Beyond this one use, trioxide of molybdenum is not employed in the arts. Metallic molybdenum, however, is now used in the manufacture of special steels.

"Trioxide of molybdenum is also called molybdic acid, as it acts as an acid with potash, soda and ammonia and forms salts. It is readily soluble in these alkalies. Molybdic acid (as it is usually called in commerce) costs about $2.00 a pound. It will be seen, therefore, that it is neither expensive nor cheap."

"THE MOTOR THAT MOTES."

Hurrah for the motor that motes!
All troubles do fly in the wink of an eye
As on the smooth road they come flashing by
The horse that is feeding his oats.

And thus with a motor that motes
They laugh and they sing—they make the air ring—
As speeds along with the spirit of spring
This car load of jolly good folks.

And life seems a regular joke;
Too short is this peace—all pleasures soon cease—
They use on the car a very poor grease—
The motor, alas! will not mote.

The horse that is feeding his oats
Pretends to be shy on passing them by,
'Tis easy to see the fun in his eye—
This car could be beaten by goats.

From the party comes not a note;
Gay music has gone, they all feel forlorn—
Wish the machine and the maker unborn—
On autos no longer they'll dote.

Their thoughts are from dreamland remote
'Till kind hearted man procures them a can
Of Dixon's Pure Flake—they cease saying——
For Dixon makes all motors mote.

—H. A. N.

The demonstration of the Dixon Company at its booth at the Automobile Exhibit at Madison Square Garden, New York, January 12–19, proved the great value of Dixon's automobile lubricants.

LIFE NOT PLEASANT

Unless Graphite Comes Along Regularly.

The following appreciative letter was pleasing to the Dixon Company and may be of interest to our readers:

"Woe to the man that put enmity between us. Life was pleasant so long as GRAPHITE put in its regular monthly appearance, but since October it failed to lift the burden of the day, and since then life is a drudge.

"Once upon a time I was receiving duplicate copies, and becoming scrupulous on this point, notified the publishers, whereupon they became angry and afflicted me as above stated.

"Now I am using graphite, also Dixon's Grease for compression cups on my engine. This I purchase from Messrs. George B. Carpenter Company, of Chicago. If you will but re-enter my name on your mailing list, I will promise never to complain even if GRAPHITE comes in duplicate, triplicate or barrel lots.

"I should also like to receive a copy of your latest pamphlet on lubrication."

NOISELESS STREET CARS.

In this age of invention it should be possible to evolve the noiseless street car. There is an opportunity here for the man of genius. The city of Chester, in this State, is moving in the matter, and has made it plain that it wants no cars that will make a noise like a thunderstorm.—*Scranton Truth.*

There is no need for "the man of genius." The remedy is plain and simple. Dixon's Graphited Wood Grease in the gear cases will speedily remedy the trouble and prevent the noise. Dixon's Graphited Wood Grease is made of soft, fine, Florida cedar sawdust, flake graphite and suitable oils and grease. It is placed in the enclosed gear cases and is continually drawn between the gears. The graphite covered sawdust prevents a metal-to-metal contact, thereby deadening the noise, and the lubrication is perfect.

Why is it not generally used ?

The solution of many mysterious occurrences is often as simple as this:

"Buffon one day entertained a company of distinguished savants, and they all went into the garden. In the center of the grounds there stood a large glass globe, which one of the guests happened to touch with his hand, when he found that it was warmer on the shady side than on the side turned toward the sun. He communicated this discovery to the other guests, who proceeded to verify the statement. What could be the cause? An animated discussion ensued, in the course of which every imaginable law of physics was made to account for the paradox. At length the scientists agreed that it must be so, owing to the laws of reflection, repulsion or exhalation, or some other law with a long name. The host was not quite convinced, and, calling the gardener, he said to him, 'Why is the globe warmer on the shady side than on the side turned toward the sun?' The man replied, 'Because just now I turned it round for fear of its cracking with the great heat.'"

DIXON'S graphite publications sent free upon request.

CITY INVESTING CO.'S BUILDING,

Broadway, Cortland and Church Streets, New York City.

F. H. Kimball, Architect. Weiskopf & Stern, Engineers. Post & McCord, Steel Construction.

Hedden Construction Co., Builders.

Dixon's Silica-Graphite Paint

is being used to protect steel work (above street level) of the

CITY INVESTING BUILDING.

Also used to protect many notable structures in New York, including the

ST. REGIS HOTEL,
HOTEL ASTOR,
BELMONT HOTEL,
KNICKERBOCKER HOTEL,
LANGHAM APARTMENTS,
APTHORPE APARTMENTS,
ALTMAN'S DEPARTMENT STORE,
McCREERY'S DEPARTMENT STORE,
CHEMICAL NATIONAL BANK,
AMERICAN EXCHANGE NAT'L BANK,
ENGINEERS' CLUB BUILDING,
71ST REGIMENT ARMORY,
MUTUAL LIFE INSURANCE BLDG.,
ATLANTIC MUTUAL INSURANCE BLDG.,
HOME INSURANCE BUILDING,
McADOO TERMINAL BUILDINGS,
BROAD-EXCHANGE BUILDING,
TRINITY OFFICE BUILDING,
BROADWAY-CHAMBERS BUILDING,
UNITED STATES EXPRESS BUILDING.

Dixon's Silica-Graphite Paint is manufactured in but one quality, the highest, and four colors.

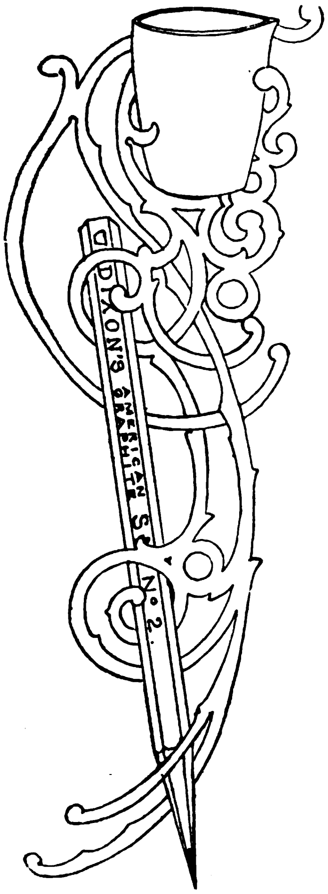
Write for folder: "Colors and Specifications."

Joseph Dixon Crucible Company, Jersey City, U. S. A.

Graphite

VOL. IX. MARCH, 1907. No. 3.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



BUSINESS MANAGEMENT.

Will B. Wilder, in *Fame*, calls our attention to a verse in the old ditty of Yankee Doodle, which the present generation of youngsters doesn't know as well as it should.

It was to the effect that when the immortal Dandy went to town on one historic occasion, he had difficulty in recognizing the place "because of all the houses."

Fame contends that Yankee Doodle is by no means the only one who has failed to discover the town because of all the houses. The business man who breaks down with nervous prostration or who is unable to handle the business as he and others would like to see it handled, has usually been trying to keep in touch with details which have obscured the real object of his search. Or, to drop the figure of speech, it is no part of the business of the general manager of a large business to check invoices and keep time on his employees.

Often it is hard for a man whose business has come up from small beginnings, to get out of the ways which were natural and proper and even necessary in the days of small things. His success has come very largely, he thinks, from his careful supervision of details and his economy. So, though the business has taken on new problems with its larger growth, he continues the careful and economical supervision of details which has become second nature with him, and gives what time he can spare to the new questions of policy and new opportunities which are arising from day to day. Perhaps he is able for a time to be his own general manager and man of all work rolled into one, but the average human brain has a limited capacity, and when that is overtaxed, nervous breakdown is apt to be the result, to say nothing of the detriment to the business.

The wise man who is the general manager of a business organizes that business in such a way that it runs without an appreciable hitch or jolt, no matter what may happen. His business ability enables him to departmentize with each department under a capable and competent head, with an understudy not far off.

In all the departmentizing the individuality of the wise general manager is not lost sight of, his presence is felt everywhere, he dominates more truly than when personally going around into every nook and corner looking after the details.

Such an individuality was shown on the *New York Sun*, when under the masterful hand of Charles A. Dana every young man on that paper thought and wrote so like the master mind, that each article in the paper seemed to have come from the pen of Dana himself.

The general manager of a great business of the present day, if he be the "wise man," will govern, direct and plan. He will see that his wishes are executed, but will not work, in the general acceptation of that word.

RUNNING MARINE ENGINE CYLINDERS WITHOUT OIL.

This is a subject which has been discussed over and again in engineering papers, and it is also a subject on which the Dixon Company has written from time to time in the columns of GRAPHITE.

The following comes to us from a commander in the United States Navy who was for a time chief engineer in the United States Navy. We don't know that he would object to our using his name, but we don't feel at liberty to mention it without his consent.

In writing concerning another matter he made mention of his use of graphite, particularly in the steam cylinders of his different engines on the ship of which he was chief engineer some years ago, and adds: "One of the first orders I gave on joining this ship was forbidding the use of oil in any of the steam cylinders, and to enforce this order I had all the oil cups removed from the steam pipes leading to the cylinders, so that it was impossible for the men to use oil. When these cylinders were examined, in intervals of, say, from three to six months, I simply had them wiped out with a little waste, saturated with vaseline and graphite, and I must say that I have never seen the cylinders and piston rings in better condition than they were on this ship during my three years' tour of duty.

"I made a personal examination of the different cylinders whenever they were opened, and they were in perfect condition, never so much as a scratch, the walls being as smooth as mirrors, and I can safely say that the use of graphite alone in steam cylinders gives excellent results, for if oil is used the oil goes through the exhaust into the condenser and into the boilers and forms an acid, which attacks the metal of the boilers and causes them to deteriorate very rapidly."

ESTABLISHED 1827. INCORPORATED 1868.

D X N
TRADE MARK

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Blacklead.

BRANCHES AT

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E. F. C. Young, John A. Walker, George E. Long, George T. Smith, William Murray, Edward L. Young, Joseph D. Bedle.

JERSEY CITY, N. J., March, 1907.

RICHNESS OF THE ENGLISH LANGUAGE.

Mr. John A. Walker, whose interest in languages is well known, hands GRAPHITE the following clipping:

The English language, one of the richest, probably, consists of some two hundred and fifty to three hundred thousand words, including, of course, many thousands of foreign words that we have boldly seized and incorporated. It is estimated that for a well-educated person, who diligently reads his Bible, the newspapers, and any general literature, a knowledge of but three to four thousand words suffices. Max Muller was of the opinion that the average farmer does not employ more than three hundred, while on an average the cultivated classes may use nearly ten times that number —an ordinary individual, however, who does not read much, manages to trot along fairly comfortable with about five hundred vocabularies. Shakespeare, who possessed an unusually fertile imagination and rich vocabulary, produced all his plays with about fifteen thousand words; Milton's works are built up out of eight thousand, and the Old Testament (in English and Hebrew) says all it has to say in five thousand six hundred and forty-two words. On the other hand, the word-riches of the Egyptian sages, judging from the hieroglyphic writings extant, consisted of but six hundred and eighty-five vocabularies. Macaulay, says George Otto Trevelyan, found that he could get along very well in a foreign tongue with a vocabulary of about four hundred words. If a man like Macaulay could manage in a foreign land with such a limited vocabulary, it is probable, and indeed certain, that thousands of us do not go much further in the use of our own language, even if it is the richest of any. Few writers have a larger vocabulary than some 5,000 expressions, and some persons assert that with 7,000 a language is acquired thoroughly.—F. W. T. L.

EXPORT TRADE CONVENTION.

Under the thin guise of an effort to promote export trade such a convention was held in Washington, D. C., in January, 1907.

It was a skillfully devised gathering, fathered by importers and exporters to bring anti-protective sentiment to bear on Congress now in session. The meeting was held at Washington, convenient to the Capitol and the White House.

While developing its tendencies speaker after speaker presented a resolution, with a carefully written paper loudly calling for tariff revision. Resolutions were also offered calling for ship subsidies and a better consular service, but tariff revision was the emphasized sentiment.

One fiery speaker explained that American trade with Brazil was small because Brazil would not buy of us unless we bought of them, and we could not buy of Brazil on account of our unfavorable tariff. This was very handsomely disproved by Secretary Root, who explained that 90 per cent. of Brazilian goods were on the American free list. The best and most crushing retort was when the president of the convention spoke favorable to a maximum and minimum tariff that Speaker Cannon replied, assenting, with emphasis, providing that the minimum be the present tariff and the maximum whatever they pleased higher. The first two days the papers were chiefly for tariff revision, but later some tariff supporters obtained the floor and gave the opposing views.—J. A. WALKER.

SHIPBUILDING.

The following figures show the world's product in shipbuilding in the years 1905 and 1906:

	1905.	1906.
By Great Britain	2,393	2,792
By the United States	146	297
By the rest of the world	947	1,055
Total	3,486	4,144

This is a hint to write to your Congressman and ask him to vote for the ship subsidy bill now before the House of Representatives. The bill is endorsed by President Roosevelt and Secretary Root. In this way an American merchant marine can be created.—J. A. WALKER.

SIGNIFICANT.

"It is significant of a new order of international relations," says an article in *Appleton's Magazine*, "that the present King Edward of England draws more revenue in interest on American securities held by his royal household than George III. ever exacted from the American colonies."

FEEDING GRAPHITE FOR LUBRICATING PURPOSES.

By W. H. Wakeman.

Chapter I.

The fact that graphite is a superior lubricant is well established, but lack of knowledge concerning the best ways of feeding this peculiar substance to steam cylinders and shaft bearings, tends to prevent its more extended use, therefore a few suggestions concerning methods that have proved satisfactory in many cases should prove both interesting and instructive to those who have not already given this important subject the consideration that it deserves. The fact that a certain method of lubricating sliding and revolving surfaces in contact is satisfactory, does not always prove that it is the best available, as it may be acceptable simply because the man in charge has not investigated the practice of others along the same line.

If a certain cylinder oil proves to be so clean and made of such superior material that no sediment can be found on the internal parts of a piston that it is used to lubricate, at the end of a year's run, and a small quantity of it prevents chattering of the valves and groaning of the piston of an engine when it is started in the morning, and there is no evidence of unnecessary friction during the day, it is good evidence that superior lubrication is secured in that case. However, there are oils in the market that leave much sediment behind them when used to lubricate surfaces that are exposed to the heat of live steam, and this shows that they are not well adapted to the purpose, because they cannot do good work if certain ingredients that form a part of them are consumed in the process.

When an engine cylinder is rusty on Monday morning after being shut down over Sunday, and the piston rod needs cleaning before it is used, it demonstrates that the oil used is not fit for the conditions existing in that plant.

In some cases an extra quantity of oil is required when the engine is first started in the morning, as otherwise it will grunt and groan badly. In others oil must be fed in almost every minute, for if the lubricator is not filled as soon as possible after the last drop has gone out of it, the engine shows signs of distress as evidence of insufficient lubrication.

There are several reasons why a horizontal engine is preferred to one of the vertical type, that it is not necessary to discuss here, but one objection to the former is that the piston must necessarily be quite heavy for large sizes, hence as it travels back and forth the friction is great, and if the piston is narrow the bearing surface may be insufficient to prevent scoring of the cylinder, and it is quite possible for this to be done before the engineer is aware of it. As a general rule it is impossible to make a piston wider after such a defect is discovered, hence some other plan must be tried. Sometimes the bull ring is chambered or bored out, and pieces of Babbitt metal set in, or a new ring may be made entirely of Babbitt metal, in order to present something softer to the surface of the cylinder. In such a case the ring will wear rapidly, making it necessary to center the piston frequently and renew the ring at short intervals.

Another plan is to construct a "shoe" of brass that will fit the lower part of the cylinder and carry the weight of the piston, but all such plans are makeshifts that are to be avoided if possible. It is quite plain that superior lubrication will partially or wholly prevent such troubles, therefore its importance cannot be overestimated. Inasmuch as Dixon's graphite is not affected by the temperature of steam at any available pressure, nor by any reasonable degree of superheat, (which is a factor to be taken into consideration in modern steam engineering), it is evident that if it can be put into the cylinder properly and applied to the parts where it is needed, the desired results will be secured.

A certain per cent. of this graphite will remain suspended in cylinder oil until it can be fed into a cylinder with an ordinary lubricator, but just how much this is can only be determined by experiment. It is perfectly safe to say that it is seldom or never the right quantity that is required for a given case, because the per cent. that will remain varies with the kind of oil, and the amount required is not the same for all engines, therefore it becomes necessary to provide appliances that will bring the whole matter under control of the engineer.

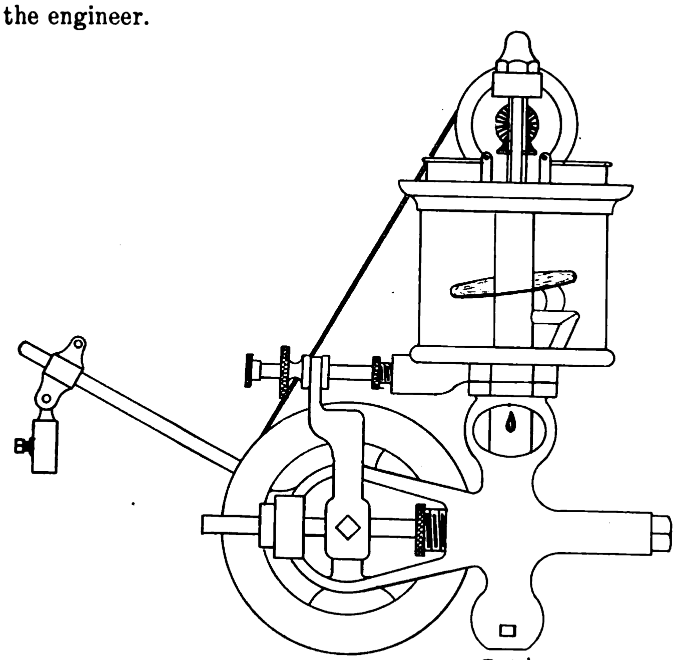


FIG. 1

Fig. 1. represents a force feed cylinder oil pump fitted with an appliance for agitating or stirring the mixture of graphite and oil so long as the pump is in use, therefore any reasonable amount of graphite can be kept in suspension and forced into the cylinder with the oil. One advantage of this plan is that the amount of graphite can be varied at pleasure to suit conditions. While treating the subject of cylinder lubrication, and the devices in use for feeding the lubricant, attention is called to the fact that where a force feed oil pump is used the feed need not be stopped for a minute, because the glass body with which such a pump is usually fitted can be filled at any time, as it is not under pressure and as it does not work by flotation, there is no water to be drawn off. This is mentioned because less oil will give better results where the feed is continuous than where it is intermittent. This may be considered a small point by some readers, but it is a point nevertheless, and must be considered in order to cover the whole subject.

It is a good idea at all times and in all places to use the smallest quantity of any lubricant that will do the work properly, but it is quite possible to reduce the amount until

the quality of lubrication secured is sacrificed to the quantity of lubricant used, which is evidently a poor policy to pursue. When the valves and piston of an engine are very poorly lubricated, they will give some external evidence of what is transpiring within the steam chest and cylinder, but if the lubrication is what is commonly termed "fair" there may be little or no evidence to this effect that can be seen or heard without making a special and careful test to determine it, but the fault is there all the same, and will have due effect on the coal pile.

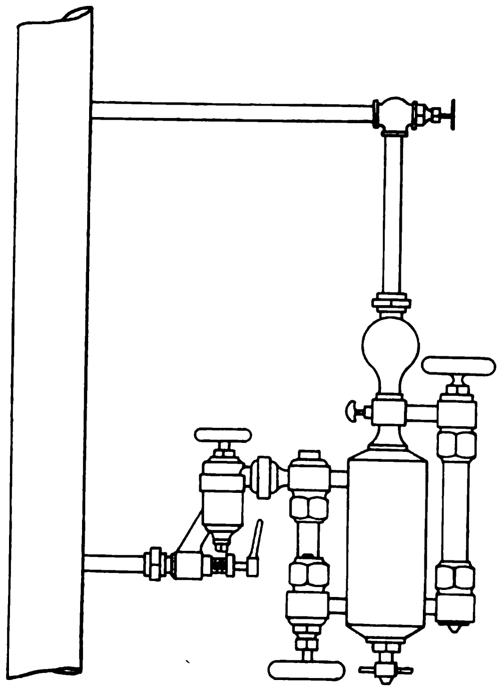


FIG. 2

Fig. 2 illustrates a good hydrostatic sight feed cylinder lubricator attached to a steam pipe in the ordinary way, except that there is a cup for the storage of graphite located so that the cylinder oil must pass through this storage cup before it is discharged into the steam. In this case no attempt is made to mix the two lubricants, as the graphite is simply put into the cup and the cover is screwed on. The oil then travels over the surface of this graphite drop by drop, each one of which carries one or more particles of graphite with it, and the latter is thus evenly distributed with the oil. This is better than feeding a mixture of the two ingredients through the sight feed, (even if they would stay mixed), as it leaves both glasses free from the dark colored graphite.

There are some cylinder oils in the market that are so black naturally that the addition of graphite cannot change their color, but many engineers prefer a bright, clean, red oil that sparkles as it ascends through a sight feed glass that is filled with glycerine. This combination lubricator will enable them to keep their bright colored oil and still feed graphite with it. When comparing the merits of various devices for oiling cylinders, the sight feed lubricator should be given credit for not having any moveable parts, therefore when one is well designed and carefully made, it lasts indefinitely if given good care. It seems to be almost impossible for some oilers to avoid dropping the plug that covers the filling hole on the floor whenever they refill one of these lubricators, but this is not due to any fault in the device.

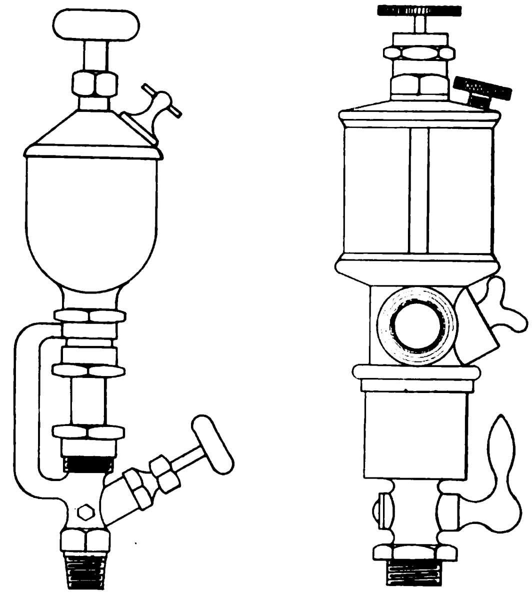


FIG. 4 FIG. 3

Fig. 3 is a lubricator for gas engine cylinders, the upper part of which consists of a cup with brass trimmings and a glass body, fitted with a sight feed that enables the engineer to see the drops of oil as they descend into the lower part, which is a plain brass cup that holds several ounces of graphite, over which the oil passes and takes particles of graphite with it as described in connection with Fig. 2.

Fig. 4 is a device for feeding dry graphite into the steam chest of an engine or a steam pump. This will be approved by engineers who do not wish to mix these two lubricants together, as a force feed oil pump or a sight feed lubricator is used to feed in the oil required, and the two lubricants mix after they enter the steam, and thus lubricate every internal part.

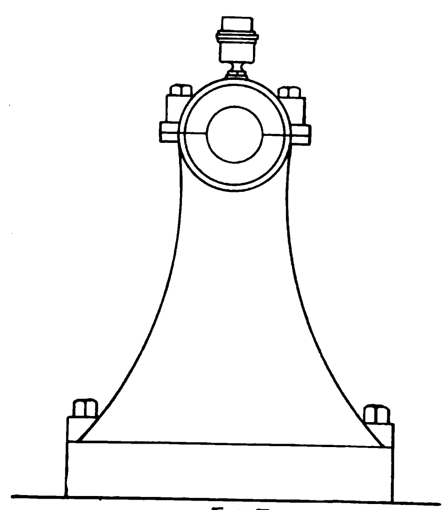


FIG. 5

Fig. 5 shows the pedestal or outboard bearing of a high speed engine fitted with a plain brass cup for holding graphite, into which oil may be poured by hand, or a pipe may deliver it from a tank system.

Fig. 6 is the same pedestal and cup, but in addition there is a sight feed oil cup that drops oil on the graphite. As shown here this cup is swung to the right side for the purpose of filling the lower part with graphite. This makes a

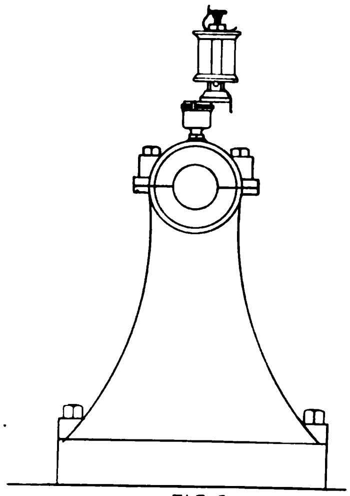


FIG. 6

convenient device for this purpose, as the oil is not colored by graphite until after it passes the sight feed glass, and both parts of it can be easily filled and cleaned when necessary.

(*To be continued*).

SOME USES FOR GRAPHITE.

Graphite has not exhausted its usefulness to mankind when it has been turned into pencils or been applied to the grate. It is one of the photographer's best friends. For all the grooves about a camera or holders there is nothing of greater service than graphite. Every amateur knows how, after even a short rest, holders have a habit of growing too big for the groove at the back of the camera, and how the shutter of those slides refuse to be withdrawn, even when considerable muscular strength is applied. Now, here are opportunities for graphite to prove its prowess. If a small quantity is rubbed well into the grooves and all the edges of the shutters, it will be found that they will slide to and fro with the greatest of ease and smoothness. One caution is needful, and that is that care be taken that no dust be allowed to settle inside the holders.—*Stoves and Hardware Reporter*.

The very best graphite for the purpose is Dixon's Special Graphite, No. 635.—ED.

GRAPHITE AS A RACE HORSE.

One of the Dixon young men interested in sporting matters brings to our attention the account of a horse race at San Francisco. One of the horses bore the name of "Graphite," and the account reads that "Graphite" "forced the pace from start to finish and won well in hand." The account also adds that "Graphite" carried an overweight of three pounds.

The Dixon Company has always claimed that graphite was useful in every conceivable industry in the civilized world, but we had no idea that there was a horse bearing the name of "Graphite," and especially one that would run so well.

LUBRICATION OF GAS ENGINE CYLINDERS.

The following letter shows what D. L. Fagnan, chief engineer of an important branch plant of one of the largest packing houses in the country has to say about the use of Dixon's Ticonderoga Flake Graphite as a lubricant for the gas engine cylinder:

Joseph Dixon Crucible Co.,
Jersey City, N. J.

GENTLEMEN:—Pursuant to your valued request of the 6th inst. duly received, I take pleasure in answering same by stating that Dixon's Ticonderoga Flake Graphite, No. 2, has served me very well since starting to use it for my gas engine in September.

We have installed here in our Cleveland Branch one 100 H.-P. Bruce-Weriam-Abbott Co.'s twin cylinder vertical natural gas engine, also one 12 H.-P., same type and make; speed of 100 H.-P. engine is 260 revolutions per minute, of small one 400 revolutions per minute.

Our gas main, leading to building, is practically a dead end to the piping in street and naturally much sand, pipe scale, etc., suceeded in entering inlet chambers and causing trouble by lodging under the valves and causing loss of compression, back-firing, poor regulation and all that, and valves had to be taken out and reground regularly to insure steady operation. The dust and sand gradually formed a pasty mass when they came into contact with the mixture of coal oil and gas engine oil we were instructed to feed into inlet when engine was shutting down, and was distributed over valves, ports, mixing valves, etc., and caused trouble by back-firing and sometimes by preventing a start.

I came to the conclusion that dry graphite in powdered form would practically overcome our trouble, so when shutting down and the cylinders were sucking in air the hardest, I threw about two tablespoonfuls of same into inlet and this was diffused all through engine cylinder, ports and valves, and after a general cleaning out of inlet ports, etc., my troubles in reality have stopped.

We have no trouble now from loss of compression, valve seats are bright, we turn valves on their seats when running, we have no more trouble with fouling of spark plugs which were rather frequent before graphite was used, and taken all in all I feel that graphite used right is an engineer's chum in every way.

I have used graphite since 1895. I always smear new shafting, boxes, crank pins, in fact all bearings during erection of same or after refitting or rebabbiting; couldn't do work properly without it.

I have marine experiences in the engine room on both the lakes and ocean, and graphite has helped us keep a big crank pin or bearing on its good behavior many a time. I consider it more in the nature of a reputation saver in an engine room than an elaborate set of tools. My advice to any one operating a gas, gasoline or oil engine is to let engine inhale a few spoonfuls of graphite every day when shutting down and note increased power and better regulation, etc., in the plant.

With best wishes, I am,

Very truly,
(Signed) D. L. FAGNAN,
Chief Engineer.

DIXON'S TRIPLE VALVE GREASE.

The following letter comes to us and shows what practical railroad men think of Dixon's Air Brake and Triple Valve Grease. It is a letter typical of many that we receive:

"Yours of October 12th to hand, and in reply will state that at one time I made a special request through our storekeeper at ——— to put in a requisition for several pounds of your Triple Valve Grease and lubricant for brake valves, but I am sorry to state that my request was ignored at ——— or ———.

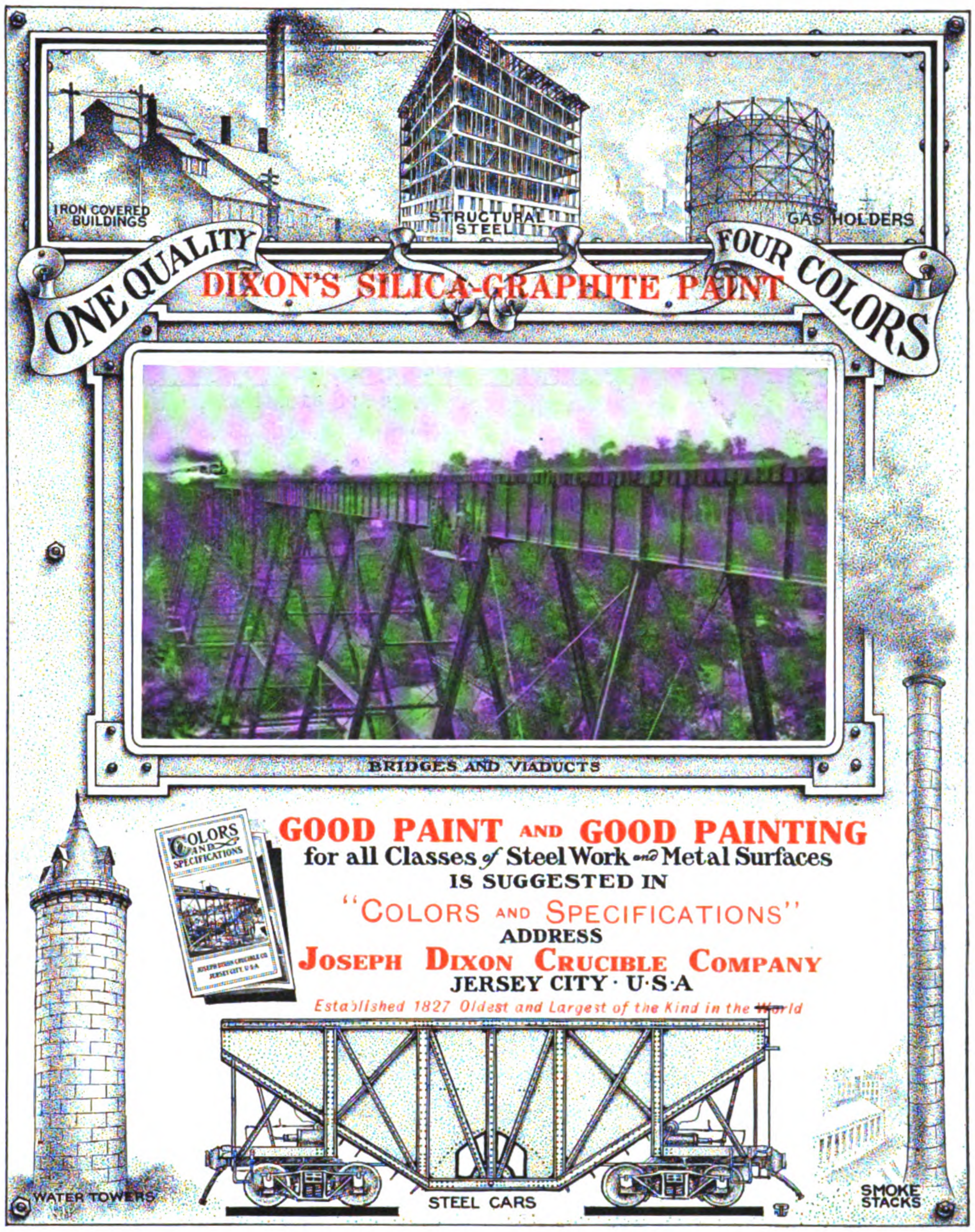
"At one time you sent me a sample, and I can honestly say without fear of contradiction, that it is the best I have ever used as a lubricant for the rotary valve of the engineer's brake valve. Our winters in this climate are not so very severe, still I have no hesitancy in saying that your triple valve grease cannot be equaled, for I have tested it so far as triple valves dared to be tested, and as I cannot force this company to buy the grease for me, I therefore kindly ask you to give me your price on 5-lb. cans. It makes my work lighter on me and gives better satisfaction to the engineers in handling brake valves and triple valves. Also, give me price of your Special Graphite, No. 635, for use in air pumps.

"You understand I have that much confidence in your grease and Special Graphite that I am willing to go down in my pocket and purchase it for my own benefit as well as for this company's."

The second letter, received from the same gentleman:

"Enclosed please find ninety cents for one five-pound tin can of your Graphite Air Brake and Triple Valve Grease. You may send this package to me by express. As I said before, I think so well and favorably of it that I am perfectly willing to go down in my pocket to purchase it, because I know the virtue of it; and, furthermore, it makes my work lighter and I make friends with all the engineers, and that counts more than the price of the grease."

The theory and practice of graphite lubrication is based upon the incontestable fact that the smoother bearing surfaces can be made the less will be the friction between them and the easier will they be to lubricate.



LETTERS THAT PULL.

Here is some good advice given by Sherwin Cody, the authority on letter writing:

Letter writing is a distinct art, built principally on applied psychology. A good letter makes a sharp impression at the right place and at the right time. A bad letter lessens the impression that may have been created by a first and stronger one. Two weak letters following one strong one will make no impression whatever.

This is what Mr. Cody says:

"Write a long letter to

"A farmer,

"A woman,

"A customer who has asked a question,

"A customer who is angry and needs quieting down and will be made only more angry if you seem to slight him.

"A man who is interested but must be convinced before he will buy your goods.

"Write a short letter to

"A business man,

"An indifferent man upon whom you want to make a sharp impression,

"A person who has written you about a trivial matter for which he cares little,

"A person who only needs the slightest reminder of something he has forgotten or of something he may have overlooked."—*The Business Monthly Magazine.*

The daily papers tell us that the man suffering with *idiopathie multiple hemorrhagic sacoma* is getting slowly better. We are glad to know it, but as there have been only four cases of the disease, so far as the doctors know, in the United States, we are a great deal more interested to know what that disease is which seems to attack treasurers about the time bills are due, and why it is no one else is able to use the check book for ten or fifteen days or longer?

C. M. HARDING.

It gives us much pleasure to show herewith the features so familiar to many readers of GRAPHITE of Mr. C. M. Harding. It is with deepest regret, however, that Mr. Harding decided to resign as he did, on January 1, from the employ of the Dixon Company.

Mr. Harding was connected with the Dixon Company for about fifteen years. He resigned to go into a business in which he will have monied interest and in which he will be so situated that he may be a great deal more with his wife and family.

Mr. Harding left the Company with the best wishes of the Company for his future prosperity. Mr. Harding, while with the Dixon Company, worked for it with his heart, his hand, and his brain. He was energetic at all times and faithful in every particular.

Mr. Harding is a past master of hard work and of details. In the fifteen years during which he had represented the Dixon Company he had become one of the important threads in the great business strand, and as he himself expressed it, it was like tearing himself apart to separate himself from the Dixon Company, but his children were growing and he felt that it was not justice to them to be away from home as much as was necessary in his work for the Dixon Company.

The following is a delineation of character from photograph by the well known phrenologists and publishers, Messrs. Fowler & Wells Company, New York City:

This gentleman is one of Nature's noblemen.

Although we do not say that when he completes his career the die will be lost, still he has exceptional ability and a well organized mind, combined with a fine physique and a healthy constitution. He must have come from a remarkably well balanced parentage, and he, in his return, should be able to parent a healthy and vigorous family.

His whole make-up betokens strength, energy, executive power, fortitude, self-reliance, forsight and forensic power. With him, the reasoning, planning, organizing mind is very strong. He does nothing without first thinking the matter over, and when he has come to a decision his mind does not then vacillate or change much.

He is not one of these erratic, impulsive, mercurial men, who do a thing one day and regret it the next. He is thoroughly earnest in everything he does and says, and is ready for emergencies.

He is a man, too, who has a heart as well as an intellect, and it is through the combined efforts of both that makes his character solid and substantial.

He reminds us of the old Roman walls of England that circle the Cathedral cities like Chester and York. They were built with the purpose of lasting for centuries; and the work that this man does is permanent and secure.

His eyes indicate honesty, sincerity and frankness. The characteristics of the nose are those of strength of purpose, resolve, a well balanced temper, and will power. His chin is a combination of the round and square, which makes a fine balance of the face and head as a whole, and represents courage and endurance.

He has enough physique to give balance of mind, and generate a stimulating influence.

He has a full development of language, which should make him an interesting conversationalist and a capable business man in explaining his knowledge of material, stock, etc.

Nothing escapes his attention that is worth looking at or studying, and for this reason he will make an excellent organizer, superintendent, manager, or leading spirit in a large executive line of work or business enterprise.

As time goes on, he will take a deep interest in the condition of his fellow men from a sociological and ethical standpoint. He believes in doing the greatest amount of good for the greatest number of people, aud deals in large and liberal ideas rather than those that serve the few.

For this reason he belongs to the great commonwealth, rather than to a small section of humanity; and the more he is drawn upon to give his judgment concerning important matters, the more he will do for humanity.

In short, his sympathies are strong, his judgment sound, his reasoning is logical, and his observations are accurate.

He should make an excellent proprietor, judicial manager, and an executive business man.

DIXON'S 677.

This grease is composed of high grade petroleum greases and right proportions of Dixon's Ticonderoga Graphite. It has a consistency of soft vaseline, and can readily be thinned by the addition of light machine oil.

We have no hesitancy in recommending this grease for any transmission or differential gear boxes where a light grease is used.

There are eleven postoffices in the United States under the name of Pomona. A gentleman in one the eleven places writes the Dixon Company and sends money for samples of lead pencils.

It so happens that he neglects to add name of his state and it so happens also that in opening the large mail of the Dixon Company the envelope is lost and we are at sea.

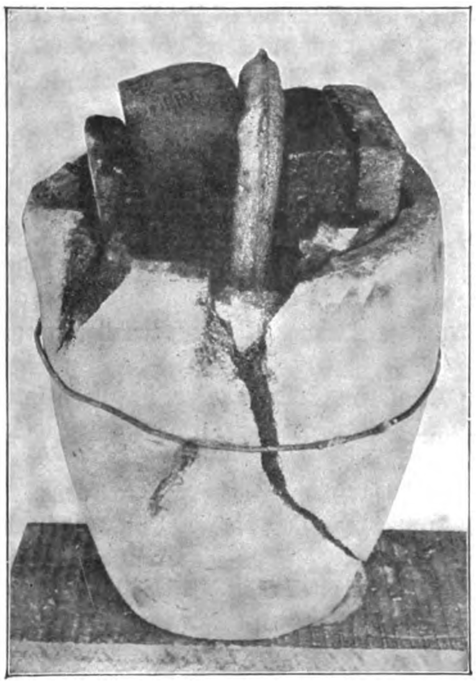
Later we get a stiff reminder of our neglect of business decency and again the name of state is omitted and again the envelope is lost.

When that irate gentleman invokes the law or something else we hope to learn the name of the state. In the meantime all the young men and women opening the Dixon mail have been charged to look out for an envelope bearing the postmark Pomona.

CRACKED CRUCIBLES IN THE BRASS FOUNDRY.

By Alexander Gehring.

I recently had an opportunity to observe an example of bad foundry practise which undoubtedly frequently happens, although it rarely is brought to the notice of anyone but the melter himself. It may be brought to the notice of the crucible maker, however, and if there is any one thing for which



Crucible Cracked by Wedged Ingots.

he is *not* to blame it is the cracking of the crucible in the manner which I am about to describe. No matter how guilty he may be for other faults of the crucible he certainly is innocent of this one.

While witnessing the melting of a pot of yellow brass in a large brass foundry, I had the opportunity to watch the melter perform his work from beginning to end. The foundry has had the reputation for careless melting, and no one seemed to know anything about the care of crucibles. The metal was in the form of ingots purchased from scrap-metal refiners, and no copper was used. The manner in which the melter filled the crucible was as follows:

It was placed in the fire and the ingots were then grasped with a pair of long handled tongs and swung down into the crucible. The last ingot would not enter well between the others, so then the melter actually took an iron bar and jammed it down so that it did not protrude any farther than the others. I said to the melter: "Is that the way you usually charge a crucible?" "Not unless I have no scrap," he said. "The ingots are too large for the pot and unless they are well packed in, the tops of them will melt and fall over the side." "Do your crucibles ever break?" I asked. "Once in a while," he said, "when we get a poor lot."

The fire began to burn rapidly, as a blast was used, and within ten or fifteen minutes a cracking noise was heard inside of the fire. The melter heard it and quickly said, "The pot's gone. That's the way they usually go; before the metal has melted at all." Sure enough, the crucible had cracked, although the metal was only at a low red heat. The crucible was taken out and fracture of the crucible mixture examined, but it failed to reveal anything of an abnormal nature. The melter said: "This is a bad lot of crucibles that we just have got in. That's the third one that has cracked this week."

I asked him if he would melt a pot of brass in the way that I would suggest. He replied that he would, but would not guarantee the crucible. We filled one of the pots loosely with ingots so that they were free to move, and placed the crucible in the fire. Soon the tops of the ingots began to melt and run down until they were in a pasty condition. Another ingot was now inserted, and when this had gone, another and so on until the crucible was full. We pulled the pot out without any cracks in it and afterwards several more. It was quite apparent that the crucibles were all right, but the melter said: "If you melt in that way you will never get your heats out. The boss will not give us any larger pots so that we can melt without packing the crucibles." What he wanted was a crucible large enough to prevent the ingots from melting and falling over the sides instead of running down into the crucible. This, perhaps, was impossible, as the crucibles were No. 25's, and to use 30's or 35's would mean extra expense and weight for the molder to carry. A pair of alligator shears with which the ingots could have been cut would have solved the problem. This part, however, is foreign to the subject.

I purchased the cracked crucible and herewith illustrate it. Although the ingots are not the same, I have placed a few in it to show the manner in which they were packed. I believe that the packing of a crucible should be carefully looked after and the melter given a practical example of how it may be done. The reason for the cracking is so simple (the expansion of the metal under heat) that there seems to be no excuse for its occurrence in the brass foundry if care is taken in packing the crucible.—*Brass World.*

DIXON'S CUP GREASES.

We have specially prepared Graphite Cup Greases which have for their base Dixon's Ticonderoga Graphite and for their body the best procurable greases on the market, and can be used in any grease cup.

They are made in six consistencies, so any conditions or any requirements can be met.

DIXON'S GRAPHITE REJUVENATES THE ENGINE.

A Western Manufacturer's Experience.

From all points of the compass letters come to us telling what Dixon's Graphite is accomplishing in different fields of activity. Among these is a recent one which we reproduce below. This tells how, when things were going from bad to worse and a costly shut-down was believed inevitable, Dixon's Flake Graphite came to the rescue and restored the complaining engine to perfect working order.

The "positive principle" action of Dixon's Graphite is thus demonstrated in actually overcoming what were, no doubt, slight mechanical defects. It would also seem to show that Dixon's Graphite is a "tonic" as well as lubricant:

GARTON TOY COMPANY,

MANUFACTURERS OF

WOOD AND STEEL EXPRESS WAGONS, AUTOMOBILES, CARTS, VELOCIPEDES, SHOO FLY ROCKERS, CROQUET, SLEDS, ETC.

SHEBOYGAN, WIS., Jan. 21, 1907.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

GENTLEMEN:—I have a good word for Dixon's Graphite which we believe you would like to hear. A few years ago we were running a common slide valve engine and we were having a great deal of trouble with our valve and cylinder groaning and chattering; it got so bad we called in the best machinist we could find and he told us to have our valve planed off and some other repairs and tightening up which shut us down two days, and when we started up we had the same trouble, and then our machinist told us that our old engine was worn out and we would have to shut down for a week and give it a thorough overhauling. When we were getting ready for this shut-down, for which we could not spare the time, as we were crowded with orders, a young man came in to sell us a Gardner Governor, and I called his attention to our trouble and he suggested trying a little graphite which we borrowed of our neighbors and put it into our cylinder oil, and our engine ran as smoothly as a new engine, and we never have had any trouble in that direction since, because we always keep a little graphite on hand to help us out. That little advice and Dixon's Graphite saved us several hundred dollars, and we got our orders out and kept us in business ever since, which you can see by looking at our rating in Bradstreet.

We give this for the good of humanity.

Yours respectfully,
GARTON TOY COMPANY,
Per E. B. Garton.

The latest in the way of an address comes to us from Pittsburg:

"JOS. DIXON SHOCK ABSORBER CO.,
JERSEY CITY, N. J."

We certainly have, in our eighty years of business, absorbed a great many shocks; but as we are now bigger and more successful than ever, it may be that a few shocks to a concern is, as David Harum said of a few fleas to a dog—good to have.

DOINGS OF THE DIXON SALESMEN.

W. B. ALLEN is working southern Illinois.

H. H. BUSH is visiting trade in northern New Jersey.

J. A. CONDIT is in middle New York. Those who know Mr. Condit will sympathize with him in the death of his mother.

J. W. CORNELL is looking after trade in Connecticut.

S. H. DOUGHERTY, Manager of the St. Louis office, is tied up in St. Louis on account of the flood.

J. FRANK DRAKE is taking care of the trade in Florida and the South.

THOMAS FINDLAY, of the St. Louis office, is doing good work in that territory.

A. L. HAASIS is busy with New England crucible business.

A. K. INGRAHAM, the war horse of the Dixon staff, made a January trip to Canada, and is now among his old time friends in western New York.

I. L. LEVISON is looking after the smaller towns in New York.

M. MARCUS, of the Chicago office, has been interviewing trade in Detroit, Cleveland and Pittsburg, and looking after convention work in Chicago.

T. A. SHERMAN is taking good orders in Texas.

E. A. ST. JOHN is working his way homeward from out of the Far West.

A. P. VAN DUSEN is assisting Mr. Nealley, Manager of the Boston office, who is busy with New England business.

S. WELLS is covering the smaller towns of Ohio.

SAM MAYER, Manager of the Chicago office, with DUDLEY A. JOHNSON, his able assistant, is tuning up the young men of that office for spring trade.

D. M. HOWE, Manager of the Pittsburg office, is keen after the paint business in that locality.

W. J. COANE, Manager of the Philadelphia office, has a score of men under him who are showing great activity in the Philadelphia territory which covers a portion of New Jersey, the greater part of Pennsylvania and West Virginia, and all of Virginia and Maryland.

JOHN M. READY, Manager of the New York office, and his young men are getting all that is to be gotten in Greater New York.

JAMES G. ALLEN, Manager of the San Francisco office, and his assistants are looking after sales on the coast and in the far western states.

ARTHUR C. BOWLES is bound for a trip through southern California and the western coast of Mexico. Mr. Bowles has greatly increased his stock of *la lengua espanola*, and is a good judge of Mexican drawn work.

R. A. BROWN is in the Far East, Japan, China, Australia and other countries in the Orient.

GEORGE W. WOLLASTON, Manager of the London office, has lately reported from Berlin.

JOHN H. BAIRD, of the stove polish department, with L. M. CHASE and A. P. WHIPPLE, are looking after the interests of Dixon's "Carburet of Iron" Stove Polish.

J. G. TIBBITTS is looking after smaller towns in western New York.

HARRY BAIRD is taking care of Long Island and Westchester County.

St. Louis Office, Joseph Dixon Crucible Co., Victoria Building.

December GRAPHITE, 1906, contained on the first page an announcement of the opening of an office of the Joseph Dixon Crucible Company, in the Victoria Building; Mr. S. H. Dougherty, Manager; Mr. Thomas Findlay, Paint Representative.

We are receiving many inquiries from the South asking us for the address of our St. Louis office, and we therefore make this further announcement that the southwestern territory is covered from the St. Louis office, Victoria Building, Bell Telephone, Olive 1835.

St. Louis is the commercial metropolis and gateway of the great Southwest. Beyond it lies an empire rich in present activity and full of future promise; more and more it claims the attention of eastern enterprise, and as the Joseph Dixon Crucible Company are always to be found in the lead, assisting in commercial developments, it is an evidence of our belief in the future of the great Southwest that has led to the establishment of the St. Louis office. This new office is now well established, and with its modern equipment, is in a position to give prompt and most excellent service to our customers.

If you do not keep for further reference the copies of GRAPHITE that are sent you, please keep this article with the illustration of the Victoria Building, the address, telephone number, etc., and place it in your list of addresses, so that you can get in touch quickly with our St. Louis office when you are in the market for graphite products.

The practical importance of Dixon's Flake Graphite in smoothing and polishing bearing surfaces cannot be overestimated. The facts of the theory and practise of graphite lubrication in its present importance in the operation of engines and machinery are clearly presented in our 82-page pamphlet, "Graphite as a Lubricant."

JUST FOR TO-DAY.

The following verses are by Bacil Wilberforce—a grandson of the great Wilberforce of England:

Lord, for to-morrow and its needs,
I do not pray;
Keep me from stain of sin,
Just for to-day.

Let me both diligently work
And duly pray;
Let me be kind in word and deed
Just for to-day.

Let me be slow to do my will—
Prompt to obey;
Help me to sacrifice myself
Just for to-day.

Let me no wrong or idle word
Unthinking say;
Set Thou a seal upon my lips
Just for to-day.

So, for to-morrow and its needs
I do not pray;
But keep me, guide me, hold me, Lord,
JUST FOR TO-DAY.

CRUCIBLES.

Their Care and Use.

The above is the title of the handsomest as well as the most comprehensive book ever published on the subject of graphite crucibles, which are also known as plumbago or black lead crucibles.

It is a book which should be in the hands of everyone interested in the melting of the various metals. It should be placed in every public library and in the library of every college that has a mechanical department. The author of this very complete work is Mr. John A. Walker, Vice-President, Treasurer, and General Manager of the Joseph Dixon Crucible Company, Jersey City, N. J.

Mr. Walker has been connected with the Joseph Dixon Crucible Company for forty years, and for thirty-nine has been an officer and director of the company and its general manager. He is thereby thoroughly fitted by his long years of experience in crucible making to be an authority on the subject, as he certainly is.

The purpose of the book is to instruct users of crucibles as to their proper use, and the dangers of abuse of crucibles. It tells what graphite is, and why crucibles are made of it. It tells why crucibles must be made of flake graphite. It tells why some crucibles are dark and others light, and the importance of that fact.

It states that most crucibles are perfect when they reach the user, and that much of the trouble that comes is due to the fault of the user. It gives rules for annealing crucibles, and tells why all of them should be carefully followed. It tells why crucibles should be bought in quantities, it tells the use of tongs for handling crucibles and their misuse by careless melters. It tells of the proper shape of tongs and how they should be handled, and how the metal should be placed in the crucibles, and how the crucibles should be placed in the fire.

The book fully describes the various fuels used in melting metals, and their effect on the crucibles. It speaks of the importance of perfect combustion.

The book also carries much allied imformation, it gives the proportions of metal in commonly-used alloys. It tells the freezing, fusing and boiling points of various substances. It gives the specific gravity of various metals and other commodities. It gives the comparative value of fuels, and much other information of value in the foundry.

The double page center of the book carries one of the most vivid and realistic foundry scenes ever presented. The illustrations throughout the book are the highest specimens of photographic art, and the book in its entirety is a credit to its well known author and to the printers, the Bartlett-Orr Press.

FRICTION.

The question, "What is friction ?" is so frequently asked that we give as answer the definition in the Standard Dictionary. Mechanically speaking, friction is a resistance to motion due to the contact of surfaces. The amount of friction depends upon the pressure of the bodies and the roughness of their surfaces; also, slightly upon their adhesion.

Without friction on the ground, neither man nor animals, neither ordinary carriages nor railway carriages could move.

FLAKE VERSUS AMORPHOUS GRAPHITE.

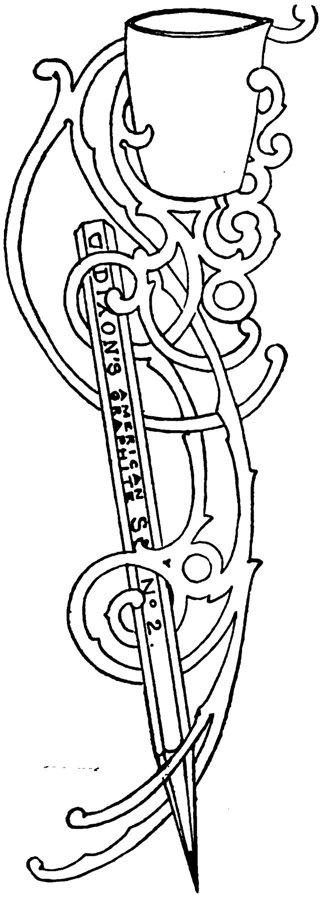
Fine, dustlike graphite flows away with the oil. The scale-like, flake graphite becomes pinned to the bearings by the miscroscopic inequalities that are always present in metal surfaces. The result is that with flake graphite there is a veneer-like coating of graphite and not a metal to metal contact. Such a desirable condition is impossible with amorphous graphite.

Remember, as we have explained from time to time, that the function of graphite as a lubricant is quite different from that performed by oil.

Graphite

VOL. XI. APRIL, 1907. No. 4.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



WHAT MR. DURYEA SAYS ABOUT GRAPHITE.

It is one thing to know you know, and quite another to convince others of this fact. At such time verification of your knowledge by a recognized authority whose opinion can be in no way influenced by personal advantage is most opportune.

Apropos of the above, we wish to substantiate our claims with reference to graphite lubrication for the motor car. While Dixon's Flake Graphite is well recognized and largely used in mill, plant, factory and engine (stationary and traction) to promote commerce and industry, there are many honestly doubting Thomases who have not yet been brought to see the exceptional lubricating advantages of flake graphite in motor cars. For the benefit of these we wish to put on record the expert testimony of Mr. Charles E. Duryea, maker of the Duryea car, and acknowledged as one of the foremost gas engineers in the country. A man of broad knowledge and wide experience—one who speaks with authority.

In his "Directions for Operating Duryea Vehicles" the following occurs:

"*A little oil and graphite applied to the compensating gear and chain occasionally are desirable.*

"*It will be understood that any mechanical parts having motion should be lubricated, either with oil or graphite.*

"*A little dry graphite on this (the chain), the gear teeth, the high clutch surfaces and the shaft end bearing each day is good practise.*

"*Use no oil on the exhaust valve, sparker stem or inlet valves, for heat will bake the oil and clog the parts. Gasoline will clean the inlet valves and prevent their sticking, while graphite lubricates the other parts.*"

These frequent references taken from different parts of the Duryea Instruction Book clearly indicate the confidence that Mr. Duryea places in graphite lubrication. And be sure that this confidence is only the result of practical experience with graphite, for Mr. Duryea could not afford to risk his reputation by supporting that which had not demonstrated beyond question or doubt its value and practicability. Likewise is it impossible to imagine that Mr. Duryea would suggest, much less recommend as he does, any lubrication for his own cars that he did not conceive to be the best. The faith of the doctor that takes his own prescription is beyond peradventure.

We also find that Mr. Duryea further supports the Dixon Company in its advocacy of the *flake* graphite over the amorphous form. Flake graphite, unlike oil, attaches itself to the friction surfaces, filling up the microscopic irregularities, polishing, smoothing and perfecting the parts. Amorphous graphite, because lacking this physical structure (flake form), does not perform such function so well, nor does it adhere so tenaciously to the contacting surfaces. In closing we wish to quote from page eight of the Duryea Instruction Book:

"*Graphite (Dixon's No. 635 preferred, but flake graphite will do) is a valuable lubricant for the chain, the high speed clutch and the gears of the transmission device. The cup on the bearing by the side of the driving sprocket should be kept filled with graphite.*"

We feel that here the strength of our case is above further comment.

INSIDE THINKING AND OUTSIDE FACTS.

Subjective satisfaction is one thing and conclusive proof is another.

It has been conclusively proved that Dixon's Ticonderoga Flake Graphite is by far the best solid lubricant in existence. Other forms of graphite, when pure, follow after, mica and soapstone follow after the different forms of graphite.

All the talk made and all the circulars printed cannot make soapstone, mica nor amorphous graphite, what nature did not intend them to be—the equals of pure flake graphite.

The thin flakes of Ticonderoga flake graphite become pinned to the microscopical irregularities of the bearing surfaces and a graphite veneering is built up until there is a graphite to graphite contact between the bearing surfaces, instead of a metal to metal contact.

Pure, amorphous graphite is just as soft and just as smooth and is fully the equal of the flake in many respects, but it flows out with the oil and has not the endurance or the toughness of the thin flakes of Ticonderoga graphite.

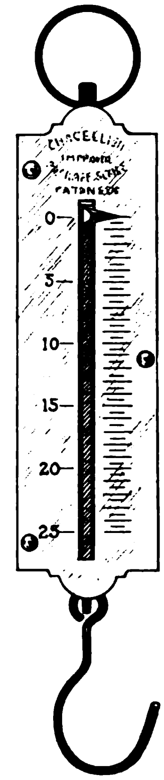
Ceylon graphite is of the foliated formation, but the flakes are heavy and thick.

All the above are facts that have been demonstrated time and time again and are now very generally recognized.

DIXON'S graphite publications sent free upon request.

GRAPHITE COMMUTATOR BRUSHES.

Their Advantage and the Proper Tension for Best Results.



The subject of graphite commutator brushes is an interesting one for the reason that the conditions under which they are used are not uniform, and therefore we do not claim that graphite brushes will always be found satisfactory.

Dixon's Graphite Brushes embody all the virtues that skill and experience can give. The Dixon Company has made use of graphite brushes of its own manufacture for a number of years and with the greatest satisfaction.

Dixon's Graphite Brushes have a desired advantage because their losses from friction on the commutator are less than with carbon brushes; in addition, the commutator is always automatically lubricated, whereas with carbon brushes there are conditions under which lubrication is necessary.

In comparison with many makes of brushes the graphite is soft, therefore the surface of the commutator should have a true and polished surface in order to insure uniform contact between the commutator and the brush.

In some cases it has been found necessary to use a pressure of from four to five pounds per square inch in order to secure sparkless commutation for all loads.

Our advice to those who desire to get best results is to be sure the commutator is smooth before putting on the brushes, as the success of any brush depends on a continuous contact from bar to bar of commutator. Intermittent contact will cause heating and sparking, and this will occur if there is a series of high spots from bar to bar.

The tension on the brushes should be square and as many men can hardly tell the difference between one pound and four pounds, we recommend the use of an ordinary balance as shown in cut. If the hook cannot be easily engaged in the brush holder, a stout string should be passed over and the hook caught in that and the reading or pressure noted on the scale.

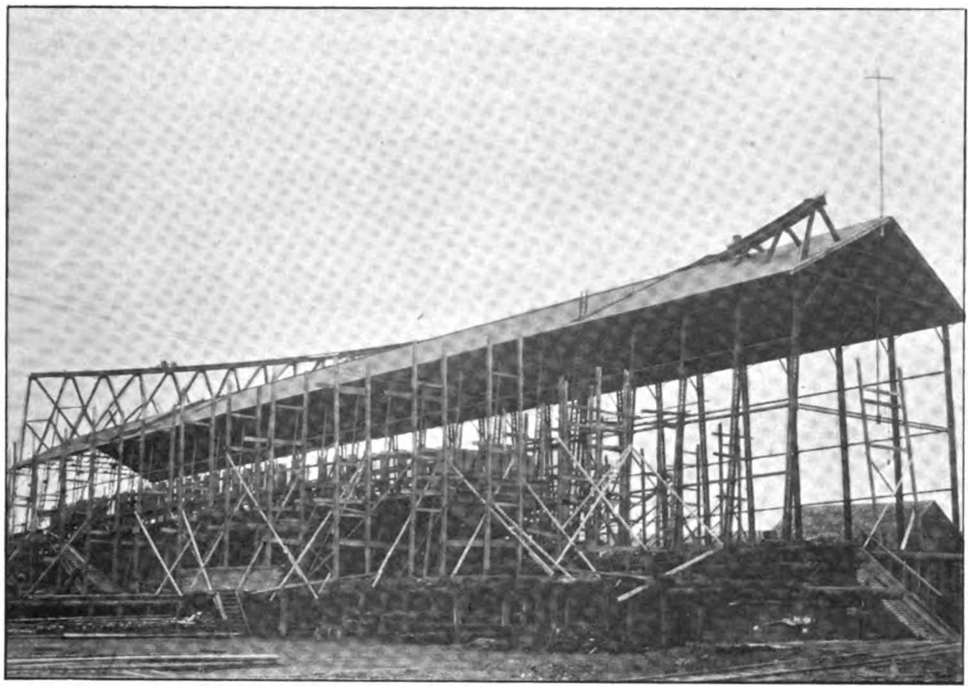
CHAIN TROUBLES.

One of the chief arguments against the use of chains for transmission of power in automobiles is that the chains become loaded with mud or grit, which causes not only wear of chains, but of sprocket teeth as well.

So great has become the complaint that manufacturers of machines are now providing chain cases or guards. The use of sticky, gummy oils or greases should be avoided at all time, whether chain cases are used or not, as flying dust will reach the chains in time and cause wear.

The proper thing to do is to wipe the chain with an oily rag and then dust on Dixon's Motor Graphite. Or better yet, treat the chain with Dixon's Motor Chain Compound, which is prepared specially for chains.

DIXON'S graphite publications sent free upon request.



BATH IRON WORKS SHIP SHED, SIDE VIEW.

"CRUCIBLES, THEIR CARE AND USE."

Joseph Dixon Crucible Co., Jersey City, N. J., booklet, standard size, 6 x 9 inches, 40 pages. John A. Walker, vice president and general manager of the Joseph Dixon Crucible Co., is the author of this book, the purpose of which is to inform the user of crucibles as to their nature and characteristics and to give them suggestions as to their use, which, if followed, will add to their efficiency and greatly prolong their length of service. The causes of scalping are gone into very carefully and valuable rules for annealing are likewise given. Other subjects touched on include pin-holes and their cause, the use of tongs and their mis-use by careless melters, the proper shape of tongs, the placing of metal in crucibles, the use of different kinds of fuel, and the importance of perfect combustion. In addition to the number of valuable tables, the book contains suggestions of help in case of accidents, rules in case of fire, and a monthly wage table ranging from one month to one year at various rates. Considered as a whole, the work is very complete and will prove of great value to every user of crucibles.—*The Foundry.*

BATH IRON WORKS SHIP SHED.

The accompanying illustrations show the steel ship shed in the ship yard of the Bath Iron Works, Bath, Me. Many steel vessels, including palatial steam yachts, have been launched from this staunch structure into the Kennebec. The ship shed is protected from corrosion with Dixon's Silica-Graphite Paint, Dark Red.

The Bath Iron Works have a world wide reputation for ship building, having constructed some of the finest and fastest vessels afloat.

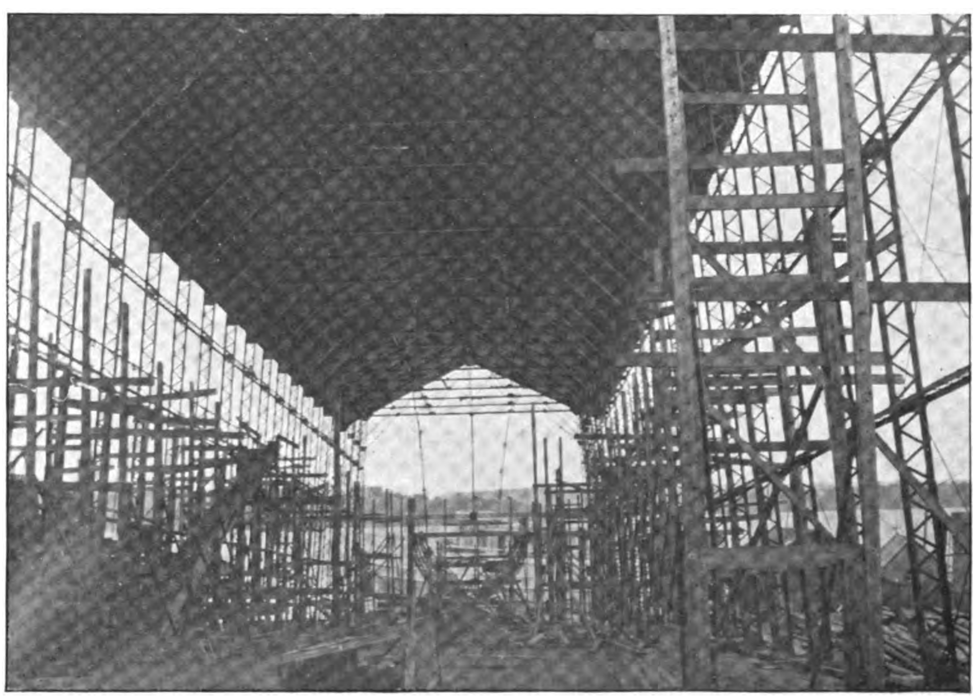
Among the vessels recently built at this busy plant is the U. S. Battleship Georgia, which proved on her trial trip to be the fastest of her class in the navy.

IF YOU use amorphous graphite look out for "pasty balls" and deposits in your engine cylinders. Amorphous graphite makes trouble, Dixon's Ticonderoga Flake Graphite saves trouble. "There's a reason."

GOOD OLD TIMES.

It is a pity that those who are all the while telling us about "the good old times" couldn't better realize what the good old times were. In a short history of social England we are told that William the Conqueror ate with his fingers, and never saw a coal fire; that the 2000 cooks of Richard II. could make neither plum pudding or mince pie; that Chaucer never saw a printed book; that Queen Elizabeth never heard of tea or a newspaper; that George I. had no umbrella and that Queen Victoria was the first soverign who tried locomotion by steam.

Of all graphites THE GRAPHITE, and THE GRAPHITE of all graphites —Dixon's Ticonderoga Flake Graphite.



BATH IRON WORKS SHIP SHED, END VIEW.

FEEDING GRAPHITE FOR LUBRICATING PURPOSES.

By W. H. Wakeman.

Chapter 2.

Although graphite is a superior lubricant, neither grease nor oil appears to enter into its composition, and while several theories have been advanced concerning its origin, scientists do not agree on this point, but we do know that it was formed in the cracks and crevices of rocks, and like other forms of carbon it is the product of a process that has required thousands of years for its completion. The fact that any form of carbon can be made into the extremely smooth, silky, and friction resisting substance that we find so valuable in engineering practise, is at once one of the wonders of nature, and an illustration of the perfection to which the art of manufacture has been brought by experts along these lines.

As found in its natural state it is mixed with foreign matter of various kinds, but it can be completely separated from all impurities. However, silica, lime, magnesia, etc., are so thoroughly mixed with it that, in some cases at least, the whole mass must be crushed in order to dispose of parts that are not wanted. The famous Barrowdale mine in Cumberland, England, produces graphite that is 87 per cent. pure carbon, but the celebrated mines of Ceylon supply an article that is 99 per cent. pure, which is exceeded by the wonderful mines at Ticonderoga, N. Y., which furnish flake graphite that is 99.9 per cent., or what we may call practically pure.

It does not necessarily follow that graphite must be absolutely pure, or even that this is desirable for some purpose, but it is a very good idea to have a practically pure article as the base for an extensive line of goods, after which various other ingredients may he added, as experience teaches what will give the best results for the service in which each product is to be used. The pure article is preferred for lubricating purposes, therefore the Ticonderoga product is superior to all others. Perhaps the average engineer cares little about where it comes from as long as it is pure enough to answer his special purpose well, but general information along these lines renders the work more intelligent and satisfactory from every point of view, and there is little danger of possessing too much knowledge about these matters so long as it is properly used and not abused.

The specific gravity of graphite is 1.81, or in other words, if a cubic foot of water weighs 62.425 pounds then a cubic foot of graphite weighs $62.425 \times 1.81 = 112.99$ pounds. This is due to the fact that pure water is taken as the standard by which the weight of everything else is compared. If the specific gravity of a substance is stated as less than one, or a fraction only, it weighs less than water, hence will float, but if it is more than one, it is heavier than water and will sink. It naturally follows that if a solid lump of graphite is put into pure water it will sink, but this does not mean that if flake graphite is sprinkled on the surface of water that has not been distilled it will sink, as it will probably float. However, when it is stirred into a solid mass it will sink in water, hence it will in oil, which is lighter than water.

Where an up-to-date oiling system is installed, oil is pumped into an elevated tank from which it is conducted in pipes to the various bearings to be lubricated. Some of these bearings may be on slow speed engines while others are for crank shafts that revolve much faster, and these evidently need better lubrication. As the amount of oil delivered to each bearing can be regulated independently, it is not a difficult matter to meet these requirements, but where high speed bearings have been heated until the metal is roughened, it takes time for them to be made smooth again, as the only way to accomplish this is to run the shaft in the bearings where they belong until perfect fits are secured. In many plants it is necessary to run these engines the same as if they were in good repair, therefore very superior lubrication is absolutely necessary.

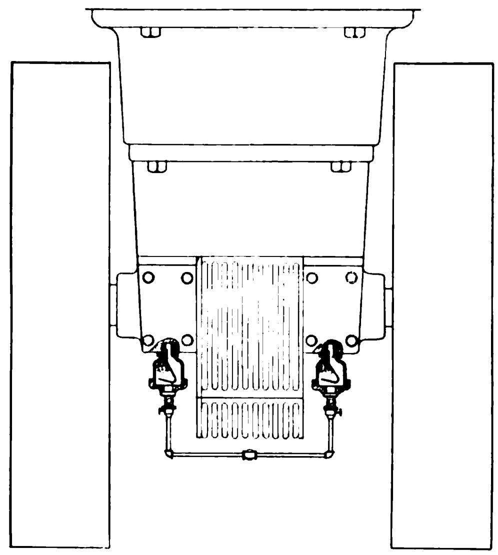


Fig. 7.

Fig. 7 illustrates a way of securing this, consisting of two graphite cups fitted to bearings on a high speed center crank engine. Oil is delivered to these cups by the pipes shown; it drops on the deflectors which carry it to the right hand, where it falls on the body of graphite, and moving over the surface of it towards the left hand, carries some of the dry lubricant with it through perforations in the supports of the

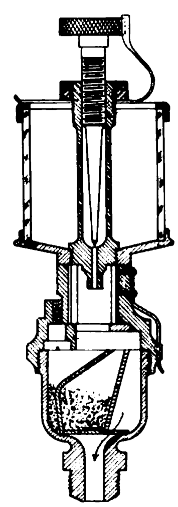


Fig. 8.

deflectors and thence down to the bearings. While these cups can be used for pure oil where it only is wanted, they are constantly ready for an emergency, and when a bearing

on a high speed engine begins to heat, it very soon becomes hot enough to melt Babbitt metal unless a remedy is quickly applied, but graphite thus at once becomes available and will prevent shutting down an engine where otherwise it would be necessary to stop all the machinery until one or more bearings could be cooled. Nobody can appreciate such a situation until he has been in charge of an electric light station supplying street lamps for a city, with only one engine in the station. This is one of the never-to-be-forgotten experiences of the writer, but it happened before these graphite cups were invented and patented.

Fig. 8 is a sectional view of a cup that is intended to be screwed directly into the cap of a bearing, and it shows the entire construction plainly. The upper part is glass, thus enabling the engineer to see at a glance the quantity of oil in it. The needle valve in the bottom is adjusted by the gnarled head on the extended valve stem, and when set to give the desired feed it is locked in place by the curved spring on the right hand side of it. As oil drops down from this cup it falls on the curved frame piece (which does not cover the whole width of the cup), and trickles over its surface until it lands on the graphite and begins to travel over the surface of it until it comes in contact with the wire cloth screen at the right hand. This allows the mixture of oil and graphite to pass out and down to the bearing as indicated by the arrow.

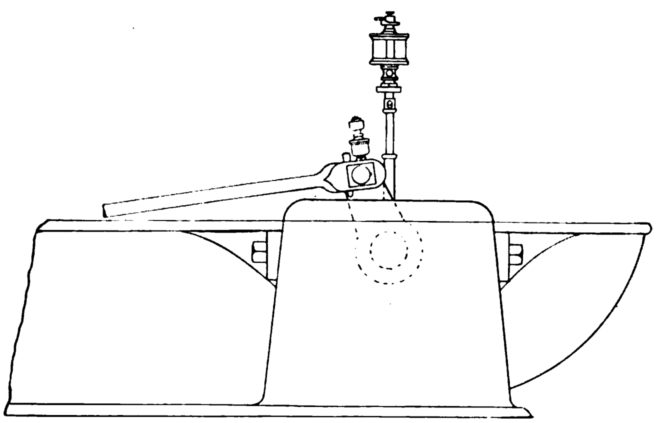


Fig. 9.

Fig. 9 shows the connecting rod, crank pin and a part of the frame of a Putnam engine. The frame is of unique design, as it is trough shaped and the main bearing is set so low that only a part of the crank appears above the frame, although the crank pin, as shown, is not at its highest point. Oil from the crank pin, wrist pin and guides, also from a sight feed oil cup that drops cylinder oil on the piston rod as it travels to and fro, is caught in this trough, filtered and used several times. A standard is set in the cap of the main bearing which supports a horizontal arm, and this carries a sight feed oil cup above the crank pin as shown, and as this oil drops down it is taken by a wiper and delivered to the crank pin. The lower part of this wiper consists of a graphite cup as already explained, and as the oil moves over the graphite it takes some of it along, and thus the mixed lubricant is put on the bearing in the most approved manner. This illustrates what can be done without referring to any special case.

This arrangement will answer every purpose for a low speed engine that drives the machinery in a mill or shop where it is run five hours and then shut down, but while Fig. 10 looks very much like the preceding illustration, it is de-

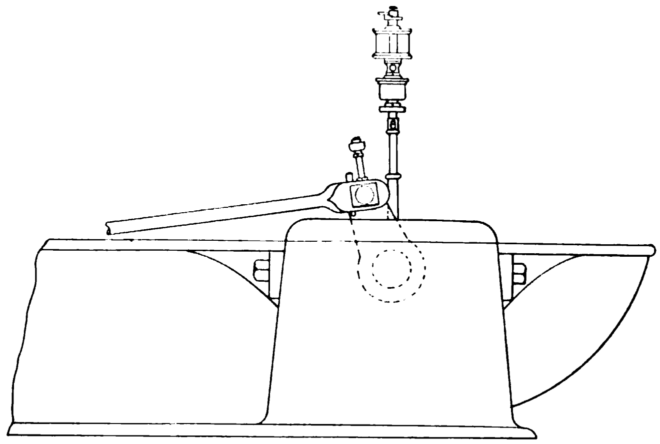


Fig. 10.

signed for much more severe service. The graphite holder is here located on the horizontal arm, consequently it is stationary instead of movable. This makes it practical to renew the graphite or clean the cup at any time without shutting down the engine, which may be run at a high speed for many days without a stop (so far as the crank pin is concerned), and the feed can be changed at pleasure.

Fig. 11 illustrates similar conditions to Fig. 9, except that they are found in connection with an eccentric used to drive a valve gear, but there is no eccentric on the Putnam engine. A wiper is not used in this case (although it might be), but the graphite cup is screwed directly into the eccentric strap and a small trough is fixed to the upper part of it. This

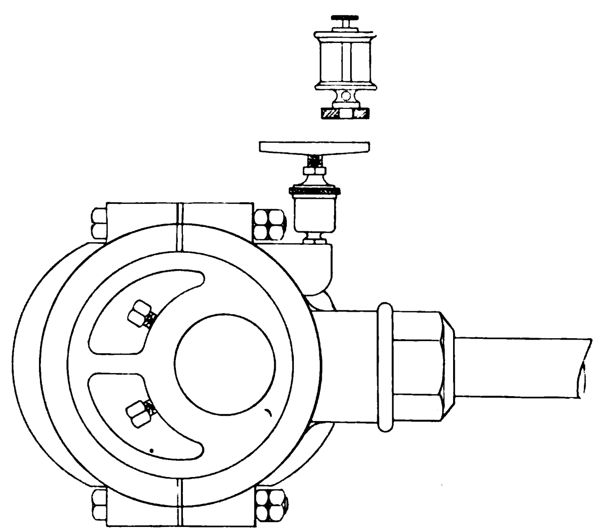


Fig. 11.

trough is longer than the horizontal travel of the strap, therefore some part of it is always under the sight feed oil cup shown, the supports of which are not illustrated. The drops of oil are always caught in this trough and quickly find their way to the graphite, and taking up a due proportion of it they go to the swiftly moving surfaces that need lubrication.

If a crank pin is four inches in diameter, the surface of it in contact with the boxes travels 12.56 inches per revolution.

If the eccentric on the same engine is 12 inches in diameter the surface moves 37.7 inches per revolution. The pressure per square inch is usually much greater on a crank pin in service than on an eccentric, but more care is always taken when making the former, in order to secure smooth surfaces and a good fit. The comparatively rough surfaces in contact on an eccentric and the high rate of speed at which one passes over the other, causes considerable wear unless the lubricant is perfect.

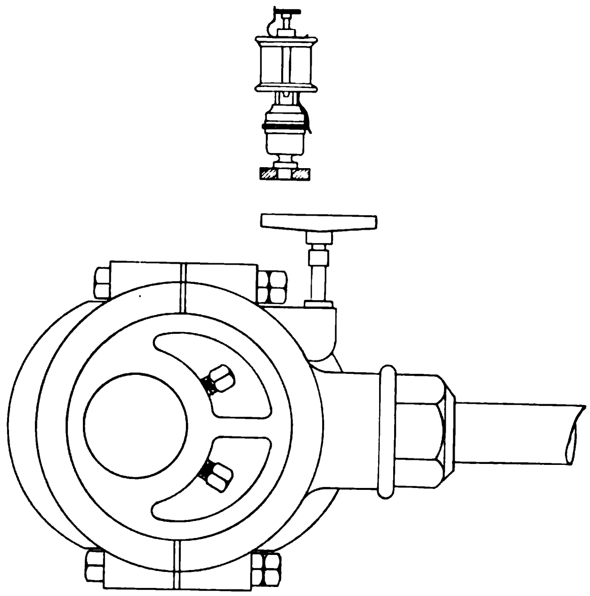


FIG. 12.

Fig. 12 is similar to the preceding illustration, but in this case the mixing is done before the oil and graphite are delivered to the trough. This plan possesses all of the advantages mentioned in connection with the crank pin lubricator of the same design.

In this connection it is well to remember that as a general rule, to which there may be a few exceptions, when a cast iron eccentric sheave is put into service for the first time it is comparatively rough, and if care is taken to view it through a microscope, it will be surprising to see how rough it really is. These remarks apply to the straps also, as they are made of cast iron too, hence we have a combination that will create excessive friction unless lubrication is complete.

The intelligent use of pure flake Ticonderoga graphite will cause these minute depressions, rough spots, and irregular places to be filled with the lubricant, smoothed over and neatly polished, therefore instead of two rough cast iron surfaces formed by the sheave and the straps coming in contact in spots only, after they have been used a short time we will have two smooth and even surfaces forming a complete bearing and rubbing together with very little friction and only light wear.

The conditions under which an eccentric operates are such that nearly all of the wear takes place on a small part of its circumference, hence the sheave wears flat to a small extent. When this becomes bad enough to require repairs, it becomes necessary to take off the sheave, put it in a lathe and take one or more light cuts from its surface. This does not alter its stroke, but it does reduce its diameter, therefore it becomes necessary to either chamber out the straps, line them with Babbitt metal and refit them to the sheave, or else make new straps. Both of these plans are expensive, therefore it is a good idea to postpone the necessity for doing either as long as possible.

Furthermore, it is desirable to do this from the engineer's point of view, because he will have to use it in an unsatisfactory condition for a long time before it will be actually necessary to repair it, and this proves disagreeable. These arguments in favor of the best lubrication that can be obtained, should be convincing to both steam user and engineer.

LUBRICATION of DRIVING CHAINS

When it is remembered that the chain is the connecting link between the power developed and the work done, the importance of its care becomes obvious. The strain to which the chain is subjected is severe in the extreme, and exposure to weather conditions and dust render lubrication difficult. A poorly lubricated chain wears rapidly, wastes power, causes endless worry, and soon gives out. A chain lubricated with ordinary oil or grease catches and holds dust and sand, and the resulting crackling and grinding sound indicates the greatly increased friction and wear that always follow.

Dixon's Motor Chain Compound.

This product is composed of Dixon's Special Flake Graphite No. 635 and neutral animal and mineral lubricants thoroughly mixed and molded into oblong cakes weighing about three pounds each. Enough of this compound should be melted in a pan to allow of the immersion of the chain. In this way the innermost wearing surfaces are reached and every pivot and joint is provided with a durable graphite bushing.

A treatment of this kind insures the best protection possible to the chain and is recommended where the best results are desired. As supporting and substantiating our claims we quote from the Chief Engineer of the London Road Car Company. He states that he uses Dixon's Graphite Chain Compound on the chains of sixty-eight omnibuses which the company is running in London. He says:

"I have increased the life of my chains, which make about 120 miles a day, by about 17 days. Formerly the chains were past their work in six weeks, they now last for two months and are less worn."

This increase of 120 miles a day for 17 days gives a grand total of over 2,000 miles, which is no inconsiderable item. And the service to which these 'buses are put is necessarily very severe and trying.

Dixon's Graphitoleo.

Where it is found inconvenient or undesirable to remove the chain, as required by the use of Dixon's Motor Chain Compound, Graphitoleo may be applied from the outside. This composition consists of the very finest Ticonderoga Flake Graphite and pure petrolatum.

Graphite is indispensable for best results on all friction surfaces subject to exposure. The natural tenacity of graphite causes it to collect in a thin veneer on the friction surface. This veneer offers protection against dust, dirt, and all corrosive influences. Laboratory tests have demonstrated the ability of flake graphite to prevent cutting even in the presence of brass filings. Such protection is absolutely impossible when oil or grease is used alone. And such ability as flake graphite possesses demands its use in some form to enable driving chains to withstand the severe conditions under which their work is done.

Dixon's Graphitoleo is put up in packages of various sizes, but the eight ounce collapsible tube is very popular for automobile use because of its convenience.

Sizes of packages are given below:

8	ounce	Collapsible	Tube.
1	pound	Tin	Can.
5	"	"	"
10	"	"	"
25	"	"	"
100	"	Keg.	

Special Preparations for Different Motor Parts.

Dixon's Motor Graphite, finely ground Ticonderoga Flake Graphite for general lubrication of the motor. Used alone or mixed with oils or greases as desired.

Dixon's Graphite Cup Greases, semi-solid in form, made in six different degrees of hardness.

Dixon's Special Grease No. 676 possesses great heat-resisting qualities. Valuable for bearings, spindles, cams, etc., exposed to heat from cylinders.

Dixon's Graphite Gear Grease, No. 677. For all enclosed gears, differentials, speed changing gears, etc. Can be used in an oil gun.

Dixon's Wood Grease, No. 688. A composition of Dixon's Flake Graphite, finely ground cedar sawdust, and certain mineral oils and greases. General consistency is heavier than No. 677. For enclosed transmission gears.

Dixon's Pipe-Joint Compound, for all joints, threaded or flanged. For spark plug, tank caps, etc.

PAINT FOR WOODEN BRIDGES.

While it is well known that Dixon's Silica-Graphite Paint is excellent for the protection of steel structures, competent street railway officials have in mind the fact that this paint makes a very desirable coating for bridges of wood.

Any of the four Dixon colors are suitable for this work. Dixon's Silica-Graphite Paint is easily applied, has good covering capacity and wears far better than lead paints. This world-famous graphite paint imparts to the wood bridge a staunch, substantial appearance suggestive of a modern steel structure.

The shades of Dixon's Silica-Graphite Paint are very pleasing for this work. Instead of causing a blot on the landscape, as is often the result of a poorly painted bridge with lead colors, the soft shades of Dixon's Silica-Graphite Paint harmonize with the surroundings in an admirable way, making the road more attractive.

Dixon's graphite publications sent free upon request.

who would explain to you the merits of Dixon's Motor Graphite Lubricants.

One of the new auto lubricants which made a decided hit was Dixon's Graphited Wood Grease, No. 688. This grease is composed of finely ground straight grained cedar saw-dust, Dixon's best Motor Flake Graphite, and the whole held together by a high grade petroleum grease. Through the courtesy of Mr. Newton and Mr. Whiting of the New York branch of the Stoddard-Dayton Auto Co., we were able to obtain a Stoddard-Dayton gear box. This gear-box is of the ordinary sliding gear type, with the one set of gears over the other, and at the power end there is a roller bearing. This box was packed with Dixon's Graphited Wood Grease, and ran for seven days, from ten in the morning till eleven at night, without a sign of any trouble due to imperfect lubrication. It was a revelation to some people to note how quietly the gears were running when in mesh, and the manner in which the grease clung to the gears.

Many people visited the Dixon booth, signed visitors' cards, and nearly all of them were interested in some one or all of our graphite lubricants, crucibles, paints, or may be just a pencil.

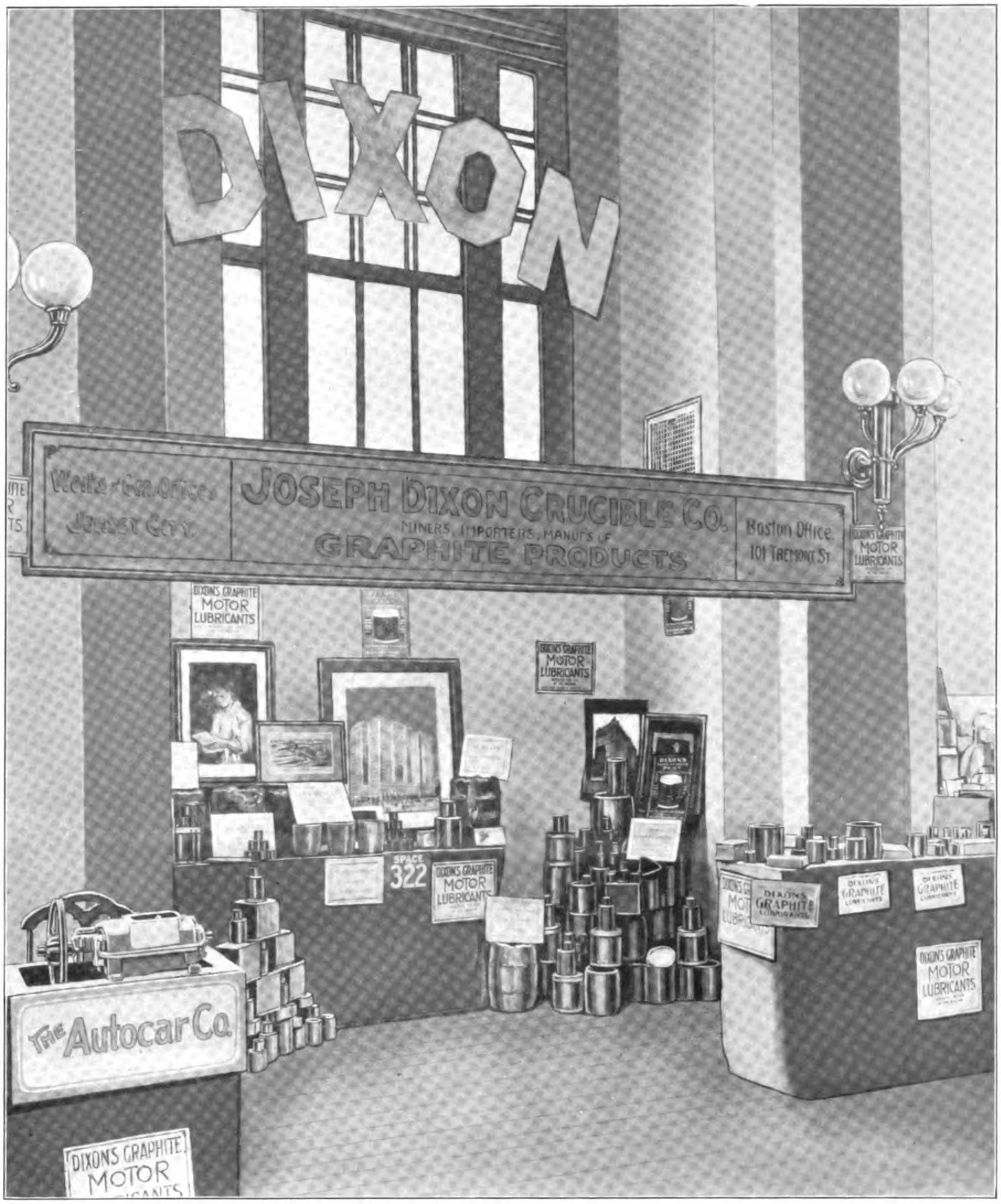
DIXON AT THE NEW YORK AUTO SHOW.

The recent Automobile Show of licensed automobile manufacturers was the most successful one ever held; this was the unanimous opinion of all who were fortunate enough to be there. The Show Committee spared no pains in their endeavor to have one general scheme of decorations. When one entered the main hall it was as though one were stepping from busy New York into the snow-bound Alpian region of Switzerland, and to find a particular booth was as hard work as it would be to pick out the trail up one of the high mountain peaks one saw in the distance.

If you were directed right by the Swiss Guards, stationed at the entrance, and climbed three flights of stairs, you would come to the Dixon booth, and you would have found one of the following gentlemen there: Mr. Long, Secretary; Mr. MacNaughton, Superintendent Grease and Paint Works; Mr. Ready, N. Y. Manager; Mr. John H. Baird, (Bishop), Manager Stove Polish Department; H. S. Snyder, Advertising Department, or L. H. Snyder of the Lubricating Department,

Due to the fact that no souvenirs were given away (rule of the Committee), the Dixon Company had a specially prepared celluloid slide; one side of which showed which one of our various graphite lubricants to use on the various parts of the machine, the other being a scale for determining horse power of engines.

The Ghost in Man, the Ghost that once was Man,
But cannot wholly free itself from Man,
Are calling to each other thro' a dawn
Stranger than earth has ever seen; the veil
Is rending, and the Voices of the Day
Are heard across the Voices of the Dark.
No sudden heaven, nor sudden hell, for man,
But thro' the Will of One who knows and rules—
And utter knowledge is but utter love—
Æonian Evolution, swift or slow,
Thro' all the spheres—an ever opening height,
An ever lessening earth.—*Tennyson.*



BOSTON AUTOMOBILE AND POWER BOAT SHOW.

The Fifth Annual Boston Automobile and Power Boat Show held in Mechanics and Horticultural Halls, Boston, Mass., March 9-16, surpassed in magnitude and brilliancy the hopes of the most enthusiastic promoters. The fact that there were over 400 exhibitors, gives an idea of the show's size.

Much taste was shown in the decoration of the halls as well as the hundreds of booths of the manufacturers and supply houses. Mechanics Hall appeared like a veritable apple orchard in full bloom and when the lights were thrown on the scene at night presented a picture fair to see. Good music added to the charm.

The exhibit of the Joseph Dixon Crucible Co. at Horticultural Hall attracted thousands of visitors, including prominent motor kings from all parts of the country. There was given a good idea of the advantage of Dixon's Graphite as a lubricant by means of the Autocar Company's transmission case in operation. The case was lubricated with Dixon's No. 688 and operated by an electric motor. This unique demonstration of lubrication made a great hit.

Dixon's Graphite Lubricants in various sized packages appeared prominently in the exhibit and the Dixon representatives were kept busy describing the advantages of these products.

A well arranged variety of Dixon Crucibles created a genuine interest. This collection included a few of the many different types of crucibles and other foundry supplies manufactured by the Joseph Dixon Crucible Co. Many compliments were given the crucibles which had done service, including the crucible from the Bristol Brass Co., which has withstood 84 heats. Three crucibles illustrating the results of proper and improper annealing won much attention.

Another very attractive feature was some illustrations of notable buildings, whose steel work is protected by Dixon's Silica-Graphite Paint, including a large photograph of the City Investing Building, New York City. The frame of the picture was painted with Dixon's Olive Green, which was used for finishing coat of the 25,000 tons of steel in this immense structure.

The inquiries received related to nearly all of the lengthy list of products manufactured by the Joseph Dixon Crucible Co.

THE CHICAGO, CLEVELAND AND DETROIT AUTO SHOWS.

To give an account of the auto shows held at Chicago, Cleveland and Detroit would hardly be more than to repeat the story of the New York and Boston shows. What differences existed were naturally those of degree rather than principle.

Our Chicago Office, which had charge of the western exhibits, reports marked success both for the shows in general and for the Dixon space in particular. The comments on the Chicago and Cleveland shows were especially favorable; these two seemed to surpass somewhat the Detroit show.

It can not but be noted how the "signs of the times" indicate a great future for the motor car. The interest and demand are constantly on the increase. Manufacturers, in many cases, find themselves unable to fill their orders, which are booked for months ahead. As we supply lubricants for all parts of the motor car, we are able to keep a finger on the pulse of the motor trade and this further assures us that the motor vehicle is "coming."

DIXON'S GRAPHITE CHAIN COMPOUND.

This compound comes in cake form and should be melted. The chain, having been previously cleaned, is dipped into the melted mass and in this way the grease and graphite gets to the innermost parts of the chain, thus insuring perfect lubrication of all the pivots and bearings. After this treatment the chain should be hung up and when dry the surplus grease wiped off.

To those who do not wish to go to the trouble of immersing their chain, we recommend Dixon's Graphitoleo, which is one of our most delicate greases. It can be used to lubricate the most delicate parts, such as automatic recording instruments, slides, cams, etc.

DIXON'S MOTOR GRAPHITE.

This graphite is one of our specially prepared forms of Ticonderoga flake graphite. It is very finely ground and to the naked eye does not look as though it were a flake graphite at all. When used properly as a lubricant for the gas engine cylinder, it makes smoother running, increased power, and fills up all the small irregularities of the cylinder walls and piston face, thus giving a higher compression.

The most successful way to introduce this into the cylinder is to put about a teaspoonful of graphite to a pint of oil in the crank case where splash lubrication is employed. It will be well for those who are interested in gas engine lubrication to write for Dixon's booklet, which explains how, when, and where to use graphite.

SMOKY EXHAUST.

Excessive smoke from the exhaust may indicate too much oil, and then again it may mean that you are using an oil containing an animal oil.

Animal oils may be added to mineral oils for use in the cylinders of steam engines, and for steam engines a compound oil may be an improvement, but for gasolene engines an animal oil should never be used, as it readily carbonizes, producing soot and smoke.

Dixon's Motor Graphite added to the oil in the crank case in the proportion of a teaspoonful to the pint of oil is the proper thing to use to get "body" and to improve lubrication. Dixon's Motor Graphite is not affected by heat, will not burn or carbonize and the thin flakes build up all uneven places or scratches in pistons and cylinders, making a graphite-to-graphite bearing instead of a metal-to-metal contact.

HOW DIXON'S FLAKE GRAPHITE WAS ONCE CONDEMNED.

A certain type automobile has a crank case and transmission case in one casting, and the whole on a slant. A certain man once used Dixon's Graphited Wood Grease in this transmission case; the result was that some of the grease got over into the crank case and in time, due to the wood fibre in it, caused the piston to bind tight to the cylinder. It was brought to the attention of a learned technical man, who has written many technical papers, and he at once condemned the use of graphite, and wrote an article in which he told how graphite would make a piston bind.

Now, it needs no elaborate discussion to prove that the binding was not due to the graphite, but rather to the wood fibre in the grease. The great danger in the use of graphite is that too much is likely to be used. People will take a whole can of it and dump it into the transmission case, perhaps use enough oil to wet it up and then wonder why they have trouble. The trouble is that too much graphite will thicken up the oil and increase its viscosity.

DIXON'S GRAPHITE WOOD GREASE.

This grease is composed of finely ground cedar fibre dust, Dixon's Ticonderoga Graphite, and a high grade of petroleum greases. The object of the cedar fibre is to form a cushion for the gears to mesh with, thus preventing actual contact with the metal surfaces of the teeth, and minimizing the wear. The grease is put up in a stiff form, and can be thinned to any desired consistency by the addition of some light machine oil.

The cedar fibre absorbs the grease and oil and prevents its dripping from the gear box and working out on the shaft. A grease similar to this has been used very successfully for a long time in the gears of trolley cars. We do not recommend this grease for all types of transmission. Where there are exposed ball bearings, or where a light grease is demanded, we have a specially prepared grease known as Dixon's 677.

DIXON'S 677.

This grease is one of a very high melting point and is to be used for lubrication of all hot places around the engine, where a grease of high melting point is demanded.

OVERHAULING A CAR.

Before placing a car in commission for the season it will pay the owner or driver to make careful inspection of every detail.

He should see that every bolt that he may be obliged to remove is removable. The threads of all bolts should be smeared with Dixon's Motor Graphite mixed with oil to a paste-like consistency. This mixture should also be applied to the spark-plug threads.

Dixon's Motor Graphite should also be rubbed on the seats of inlet and exhaust valves, and on the guide stems.

All the old oil and the dirt should be removed from the crank case and new oil added with Dixon's Motor Graphite—using a teaspoonful of the graphite to every pint of oil. Use mineral oil only. Do not use animal oil or compounded oils in gasolene engines, they burn and form carbon deposits.

Sprinkle Dixon's Motor Graphite on the inside of the tire shoe. It will prevent the inner tube from sticking and is better than chalk or soapstone.

If springs squeak introduce Dixon's Motor Graphite under the leaves. This prevents rusting and stops squeaks. See that cotter pins are in their places and remember that if they are rubbed with graphite they will not rust and can be removed easily.

Pack the wheel bearings with Dixon's Graphitoleo—made of high grade vaseline and Dixon's Motor Graphite. It is unequaled as a lubricant for either plain, ball or roller bearings.

Remember that Dixon's Flake Graphite builds up and forms a graphite-to-graphite bearing instead of a metal-to-metal contact, and that all oils and greases are improved by a proper addition of pure flake graphite.

Remember also, please, that the Joseph Dixon Crucible Company prepare graphite cup greases in six degrees of hardness and special graphite lubricants ready for use.

For driving gears of magnetos use Graphitoleo or Dixon's Motor Graphite mixed with heavy cylinder or machine oil.

Fill your gear case with a Dixon graphite lubricant, but before doing so let us know what machine you drive, as a lubricant every way suitable for one machine will not answer at all in another machine.

If you have a leather faced clutch and can get a small quantity of Dixon's Traction Belt Dressing, you will find it useful on the leather. It keeps the leather soft and pliable and prevents slipping.

If Dixon's Motor Graphite is well rubbed into the valve seats and on the valve stem guides, it will prevent leakage and sticking.

Don't use sticky oils or greases on transmission chains. Oils and greases gather dirt and dust. It is better to polish with Dixon's Dry Motor Graphite. Dust and dirt will not stick and chains will run better and wear less.

Polishing valves and valve seats with Dixon's Motor Graphite largely prevents burning and pitting, and prevents leakage and loss of compression.

All ground joints should be treated with a mixture of Dixon's Motor Graphite and oil, or better yet with thin, specially prepared Graphite Pipe-Joint Compound. If for any reason it is necessary to break the connection it can be easily done without danger of taking part of the joint with it.

INCIDENTS OF THE AUTO SHOW.

A gentleman who is at the head of the street cleaning department of one of our large cities was telling about his experience with Dixon's Graphitoleo, and during the conversation he said that he would tell us of a radical departure from most forms of gear lubrication, which he had successfully used. He told us to take cigar boxes, break them up and mix with Graphitoleo. He said an old shipwright had told him to do this. We stopped our motor and showed him the grease we had in the transmission box, and explained to him about how we had been working for a long time to get a proper grade of wood fibre and petroleum grease for enclosed gears; a fibre which would at all times keep its elasticity, and not become dead, as cork will do.

A physician told of how, as a member of the Board of Health, he had made the trolley car companies use Dixon's Graphite Wood Grease, made for electric gears (another form specially prepared for enclosed gears of electric cars,) to silence them as they were a public nuisance before treatment.

Mr. John A. Walker, our Vice-President and General Manager, was one of the interested visitors at the show; also Mr. C. H. Spotts, Manager of the Paint Department; Mr. Engelbrecht, Superintendent of the Pencil Lead factory; Mr. Reed, of School Pencil Department; Mr. Dailey, Purchasing Agent; Mr. Westervelt, Shipping Agent; Mr. Price, of Philadelphia; all the boys from the New York office and many from Jersey.

The owner of a high priced foreign car was looking at our No. 688 (Graphite Wood Grease), and he told us that his gears were very noisy before using Dixon's Special Grease, but that they run very quietly now. We do not recommend Dixon's 688 Grease for all types of transmission, but we do recommend it for any type of transmission where there are no exposed ball bearings.

Many persons told us that they had used Dixon's Flake Graphite very successfully in connection with cylinder oil; that they had found better regulation, less fouling of the spark plug (due to the carbonizing of the oil) and less danger of seizure due to lack of lubrication.

It is a known fact that there are small irregularities, that, try as hard as you will, you cannot get them absolutely smooth. The function of the Dixon's Flake Graphite is to fill in all these small irregularities, and give a coating of the flake graphite, which is generally recognized as one of the best solid lubricants known. We expect sometime in the near future to have something more to say on this subject.

BILIOUS.

Is life worth living?
No, it ain't,
Unless your liver
Is a saint.—*Bohemian.*

VILLAGE WRECKED BY TWO EXPLOSIONS.

Air Tanks Sets off Dynamite at Pennsylvania Tunnel in Homestead, N. J.

"A compressed air tank containing 15,000 cubic feet of air, and a dynamite magazine holding four tons of dynamite, exploded at Homestead, N. J., near the mouth of the tunnel the Pennsylvania Railroad is building under Bergen Hill at 12:12 o'clock this morning. No one as far as can be ascertained was killed by the explosion, and those injured were hurt in their homes, the windows of which were shattered by the force of the explosion.

"The explosion in the air tank, which occured first, did very little damage except to the tank itself. The supposition of those who were acquainted with the work and visited the scene was that some of the oil used to lubricate the receiving machine on top of the tank had filtered down into the tank and caused spontaneous combustion.

"The air in the tank was used for keeping a supply of compressed air in the tunnel, with which the tank was connected by a system of pipes. When the explosion occurred the air was forced into the tunnel, but as far as could be learned did no damage whatever.

"The detonation of the first explosion, however, caused the dynamite in the magazine some distance away to explode. The two explosions took place only a few seconds apart and sounded as one, the hill back of the tank acting as a sounding board and causing the sound to be magnified to such an extent that the report was heard, not only in Manhattan, where it shook every building, but as far away as Coney Island and Whitestone, L. I."

The above is from the *New York Times* of March 4th. The following is taken from "Air Compressor Lubrication," a pamphlet issued by the Joseph Dixon Crucible Company.

"It is a well-established fact," states a prominent engineering journal, "that a compressed air system, that is, the air compressor, receiver and discharge pipes, has within itself the potentiality of destructive explosion if the matter of air-cylinder lubrication is indifferently attended to."

In the course of an article on "Temperatures in Air and Ammonia Compressor Cylinders" (*Engineering Magazine*, August 1905), Mr. Leicester Allen, the author, writes:—

"One of the dangers in air compression which has not been fully recognized until within a quite recent period is the liability to explosion in air-compressor cylinders when the heat of compression is caused to exceed the flashing-point of the oil used for cylinder lubrication. Several more or less serious accidents of this nature have been recorded within a period of three or four years."

In their pamphlet the Dixon Company have carefully considered the following:—

First. The causes of ignitions and explosions in discharge pipes and air receivers.

Second. The function and value of Dixon's Flake Graphite as an air cylinder lubricant, from the theoretical as well as the practical standpoints.

Third. Methods of feeding flake graphite, and

Fourth. Some secondary advantages in graphite lubrication as suggested by the application of compressed air for special purposes.

There is also included a chapter on the practical benefits of graphite lubrication for rock drills because of their intimate association with many compressed air installations.

If you do not possess a copy of this pamphlet we shall be very glad to send you one on request without any charge.

DIXON'S MOTOR GRAPHITE AS COMPARED WITH OIL AS A LUBRICANT FOR THE GAS ENGINE.

This test was conducted by two seniors in one of our leading technical institutions. The object of the test was to determine if there was any advantage gained by Dixon's Motor Graphite with oil, over cylinder oil alone as a lubricant for the gas engine cylinder. The gas engine used was a single acting, single cylinder, 7"x9", four cycle, 8-H. P. Ohio Gas Engine of 290 R. P. M.

The lubricants were tested on the friction load, which was about 2½ H. P., as with this run any change in the friction of the load will show up greatest with least liability of error. We know that in this test the conditions favored oil lubrication, because with no load on an engine scarcely any oil is needed for lubrication, as the thrust of the piston is very slight, also much less gasolene is required, as explosions are comparatively few, thus giving the cylinder time to cool off between the time of the explosions. As the engine has a hit and miss type of governor, every time there is a miss the air, cool from the room, is drawn in, as the air valve is held open, thus cooling the cylinder.

The runs were of two hours duration, and observations were made every fifteen minutes. The first run was with oil lubrication alone, using about ten drops of oil per minute. This run shows the effects of oil lubrication on the engine. The other run was made with motor graphite and oil, about six drops of the graphite and oil per minute. The run with graphite and oil was made under the same conditions as the run with oil; the same position of the needle valve, practically the same amount of jacket water, the same amount of lubrication of the bearings other than the cylinder, and every time the admission valve admitted a charge of gasolene there was an explosion.

Before making the runs with graphite, the cylinder head was taken off, and the cylinder walls wiped off from the head and crank end, as the piston was moved backward and forward. Dixon's Motor Graphite was then rubbed into the walls of the cylinder with the hands several times after the piston had been worked backward and forward.

The cylinder walls were worn fairly smooth (as the engine had been in constant use for nearly three years) with no bad cuts or very rough places, so that but little of the graphite could be worked into the walls. If it had been advisable to have taken out the piston, more of the graphite could have been worked into the cylinder walls and into the piston, but this was not thought advisable due to the fact that it was impossible to get the same adjustment with the bearings.

During the run with motor graphite, about one teaspoonful of graphite was put into the cylinder every fifteen minutes; this was done by means of an indicator cock. When the cock was closed graphite was poured into a cap screwed on top, the valve opened, and graphite worked into the

cylinder by varying pressure. A little graphite was also squirted into the open end of the cylinder about every fifteen minutes with a bug gun.

If a special lubricator, for instance such as the Comstock, manufactured for air compressors, had been used it would have insured a more steady supply of lubrication, and greater certainty of it's going to the right places. However, this test was only a crude one; yet it shows that Dixon's Motor Flake Graphite is a good thing for a cylinder of the gas engine, when used as we recommend automobile users to use it. Much better results could have been obtained in favor of the flake graphite if a comparatively new engine and a specially prepared apparatus had been used.

Referring to the data below it will be noticed that the speed and number of explosions were practically the same. In a run with oil alone the temperature of the exhaust gases averaged 435.6° F., while with motor graphite and oil the temperature of the exhaust gases was but 394.6° F., showing 41° difference in the temperature of the exhaust gases.

In run No. 1 there were 23.290 *B. T. U. absorbed by jacket water, and in run No. 2, 28.800 B. T. U., showing that there are 3,510 more heat units available for work with the motor flake graphite and oil than with the oil alone, as more heat was generated and less lost in the exhaust gases due to the fact that the flake graphite filled all the small irregularities, thus making it possible to get a higher compression.

Looking at the explosions per minute, it will be noted that there were a less number of explosions per minute with the motor graphite and oil, than there were with oil alone; thus showing that each explosion (with motor graphite and oil) was stronger than when oil alone was used.

This test proves what the Dixon Company has always advocated, that less oil may be used in connection with Ticonderoga Flake Graphite; that graphite cools the cylinder and thus prevents carbonizing of the oil and fouling of the spark plug. If the run had been made with a heavy load the difference in favor of graphite would have been more noticeable.

Those who are interested in the economical problem will notice that *A. B. T. U. is the amount of heat required to raise one pound of water 1° F. at 39.1°, which is the maximum density of water.

There is only sixty per cent. of the oil used in the last run, as there was in the first. Four drops of oil per minute would in time amount to a great deal, while the amount of graphite used was comparatively small.

Another advantage which must not be overlooked is the fact that if for any reason or other the oil supply should fail, the graphite in the surfaces of the parts will prevent any seizing or cutting.

At the end of the run the cylinder head was taken off and the condition of the cylinder was noted. They were as smooth as before, only not quite so highly polished. Many people when they take off their cylinder head, look at the cylinder and seeing the highly polished cylinder are content, because they think that due to the mirror-like appearance they have perfect lubrication.

This high polish is not due to lubrication, but rather a lack of it, because the friction of the constant rubbing of the metal has made this apparent high polish.

RUN 1.

Run cylinder oil alone. 10 drops per min. Time 2 hrs.

Time	R. P. M.	Temp. of Exhaust Gas	Room Temp.	Cooling Water Cold	Cooling Water Warm		Explosions per Min.
11.00	304	432	66	50	84		59
15	304	436			84	Time of	59
30	303	436	68	50	84	flow of	60
45	302	436			84	200*	56
12.00	305	440			85	Jacket	61
15	304	440	71	50	85	Water	59
30	305	434			84.5	35 min.	61
45	304	435			84		63
1.00	304	431	70	51	84		63
Average	303.9	435.6	69	50.2	84.2	685	60 av

Jacket water per hr., 343 lbs.
Gasolene per hr.,....1 4 pints.
23,290 B. T. U. absorbed by jacket water.

RUN 2.

6 drops of cylinder oil and a small amount of motor graphite.

Time	R. P. M.	Temp. of Exhaust Gas	Room Temp.	Cooling Water Cold	Cooling Water Warm		Explosions per Min.
1.32	300	373	72	54	89	Time of	50
47	302	386			90	flow of	58
2.02	302	390	73½	54	92	*200	50
17	303	408			95	J. W.	61
32	302	406			96	33½	51
.47	301	412	74	54	97	Min.	55
3.02	300	400			95½		65
17	300	386			94		58
32	302	390	74	54	98		62
Aver.	301.3	394.6	73.4	54	94	720	56.6

Jacket water per hr., 360 lbs.
Cylinder oil drops per min., 6.
Gasolene per hr., 1.9 pints.
*28,800 B. T. U. absorbed by jacket water.

THE VALUE OF BREVITY.

Not long ago, at a meeting of a literary club in the Quaker City called the Franklin Inn, says the *Philadelphia Bulletin*, a young poet, licking his lips, said that Conan Doyle was paid $1 a word.

"That is nothing," said a railway advertising man. "I know of a case where a man was paid $1,000 a word. Our line used to have at its grade crossings a very long and complicated sign that began: 'Beware of the engines and cars,' and then this sign went on with a lot of injunctions and warnings that would have taken five minutes to read. In a number of accident cases the complainants for damages declared that our long signs were not clear warnings. Therefore the line decided at last to get a new grade crossing sign, and Judge Paxon was engaged to write one. The sign that Judge Paxon wrote cost $1,000 a word, but it was a classic. It remains a classic. It is as well known among us as 'Father, I cannot tell a lie,' or 'England expects every man to do his duty.' The sign that cost $1,000 a word, or $6,000 in all, was the famous 'Railroad Crossing—Stop, Look and Listen.'"

SPRING—THE RENEWAL SEASON OF NATURE.

The rapidly passing seasons have each their charming landscape effects, but no season delights and refreshes as Spring, with the newly blended shades of the trees, flowers and grass. Spring, the renewal season of Nature, always thus adorns in harmonious colors the lawns, hills and meadows. The general effect of the landscape is unfortunately too frequently marred by outlines of structures in decay, through man's neglect.

The constantly increasing building and bridge constructions of massive design, should be in keeping with the efforts of Nature. The fundamental rules for structures are—pleasing architectural lines and careful maintenance. This short talk on Spring Painting is only intended to point out Nature's methods, as a suggestion as to what should be done for the care and beautification of structures of metal and wood.

Metal and wood deteriorate most rapidly under exposure day and night to the moisture of rain and snow; the great heat of the sun, and the destructive workings of the gases of combustion incident to greatly increased manufacturing and transportation enterprises. This destructive chemical action between metal and oxygen occurs in the form of ever spreading discolorations of a variety of repellent brown shades. An interference with the dignified beauty of effect, and a sure sign of neglect.

In this short talk we will tell of a material that will adorn and preserve for a long period of time, any class of metal or wood to which it is applied. This preservative is more fully explained in a new technical book, "Philosophy of Protective Paint," published by us, and sent upon request.

The book tells that among the provisions of Nature for the benefit of mankind, is a silvery gray ore, found at Ticonderoga, N. Y. This ore is known as Flake Graphite, a form of carbon of which diamonds are a class, and like unto them, practically indifferent to chemical influences.

The Joseph Dixon Crucible Company some forty years ago discovered that the life of metal and wood could be preserved permanently by the application occasionally of a coating consisting of this Ticonderoga Flake Graphite with linseed oil as a vehicle.

The flake, crystalline form of this natural ore, refined to a remarkable degree of fineness, adapts itself perfectly under the sweeping pressure of a paint brush into a shield, protecting and prolonging the life of the linseed oil.

The product has been known for years as Dixon's "Silica-Graphite" Paint. The silica is a component part of the flake graphite pigment, and of like formation, being inert and unchangeable by the gases and atmospheric conditions continuously encountered. The natural silica-graphite ore is of remarkable smoothness, permitting in its use as a paint pigment, ease of application and good covering power, which is generally estimated at 500 to 600 square feet to the gallon for metal, and 300 to 400 square feet to the gallon for wooden surfaces. This paint is serviceable and sightly for fences, smoke-stacks, roofs, cornices, water towers, cars, bridges and all classes of metal and wood construction.

The chief decorative advantage is found in the remarkable ability of the paint to retain practically its rich original color. The Ticonderoga flake graphite ore is of a silvery gray color, and we manufacture it in four shades—Dixon's Olive Green, Natural, Dark Red and Black, confining the amount of coloring pigments to a minumum, so that at all times there is an evenness of color tone.

The proper application of protective paints is a matter of decided importance, and all specifiers and users of paints should secure a copy of our folder "COLORS AND SPECIFICATIONS," containing practical suggestions for painting new and old work.

Particular attention will be given to letters on the subject of "Spring Painting," addressed to our general offices or branch offices.

IMPORTANCE OF GOOD CORRESPONDENCE.

The Business Man's Magazine says, too much stress cannot be laid upon the importance of sending out correspondence in a manner that will create a good impression. The impression of good stationery, style and manner is lasting. Imitation typewritten letters, fac-simile signatures or rubber stamps for signing letters are considered very bad form.

We were reminded of the above by receiving a very poor imitation typewritten letter with a lead pencil signature impossible to read, and yet the letter comes from the agency of one of the highest priced and best known automobile manufacturers. The sender was not even careful to get the name correct, as it was addressed to "Mr. Joe Dixon."

Flake Graphite, added to oils used in cylinders and bearings, prevents rust and lessens friction.

CATALOGUES FOR SPANISH COUNTRIES.

The *U. S. Consular Report* says: "A catalogue for a Spanish speaking country is of no more use when printed in English than a Spanish catalogue would be here, and it is a waste of time and money to send them out."

This is not quite entirely nor altogether so. The Dixon Company very frequently have letters from Spanish firms in Mexico and South America in which the writer suggests we may send our catalogue in English if we do not have it in Spanish. Then again, some of the letters indicate that the Spanish firms are proud of the ability to read and understand English. Of course, it is wise to have the catalogues in the language of the country to which it is sent, but the shame of it all is that so few Americans take interest in any language safe their own.

Mr. John A. Walker, Vice President and General Manager of the Joseph Dixon Crucible Company, has pointed out in several articles which have appeared in GRAPHITE, the wide difference between Americans and foreigners in the matter of languages, as observed by him in his travels abroad.

IF SOMEBODY HAD RUN OFF WITH POE'S UMBRELLA.

Hear the drip, drip, dropping
    Of the rain!
Hear the splash, splash, plashing
    On the pane!
And I sit here and I wonder
    Where in thunder,
    Where in thunder,
Is the man who borrowed my umbrella?
For he seemed a likely feller
And I lent it to him without hesitation.
    Tarnation!
Now I want that same umbrella,
And that likely-looking feller.
    Where is he?
    Where is he?
    How it's pouring!
    Hear the roaring
Of the rain upon the roof!
    Woof!
How the dripping trees all glisten!
And I sit here and I listen,
    Yes, I listen
To the splash, splash, plashing
    On the pane!
To the drip, drip, dropping
    Of the rain!

—*Somerville Journal.*

A PUZZLER.

Here is a puzzle from the *Boston Globe* that is both interesting and amusing. Take the number of your living brothers, double the amount, add to it 3, multiply by 5, add to it the number of your living sisters, multiply the result by 10, add the number of deaths of brothers and subtract 150 from the result. The right hand figure will be the number of deaths, the middle will be the number of living sisters, and the left hand figure will show the number of living brothers.

CRUCIBLES WHICH LEAK BUT WHICH DO NOT SHOW SCALP IN THE USUAL WAY.

One of the Dixon crucible experts was called to examine a crucible concerning which complaint had been made. He expected to find a scalp; what he did find was in the nature of a pin hole about three inches from the bottom of the crucible. Upon breaking the crucible he found a sheet of metal embodied in the walls of the crucible. The sheet extended over a considerable area of the lower side and bottom of the crucible. Careful examination led the expert to the opinion that this crucible had started to scalp and that the scalp had not separated from the pot, but the fracture was there just the same. The metal found its way through the thinnest portion of the wall into this fracture and spread in all directions until it reached the edge of the fracture about three inches from the bottom, where it appeared on the outside of the crucible.

Although we have examined a great many leaky crucibles which have shown traces of metal all through the pot, yet this particular one appeared perfectly sound everywhere except at a point which would represent the line of fracture on an ordinary bottom scalp.

We intend to follow up this theory, and it is barely possible that we may find quite a proportion of pots which leak in this way, to be accounted for on the scalp theory. In one instance where the scalp had occurred on the bottom of the pot the whole bottom had shifted a half to three-quarters of an inch to one side and then fused again, so that when the pot came out of the fire it looked all right, except that the bottom was on crooked. This strengthens the theory that a scalp may occur and the piece still retain sufficient tenacity to remain in its position and consequently not show as a scalp from the outside.

We should be very glad to hear from crucible users on this subject.

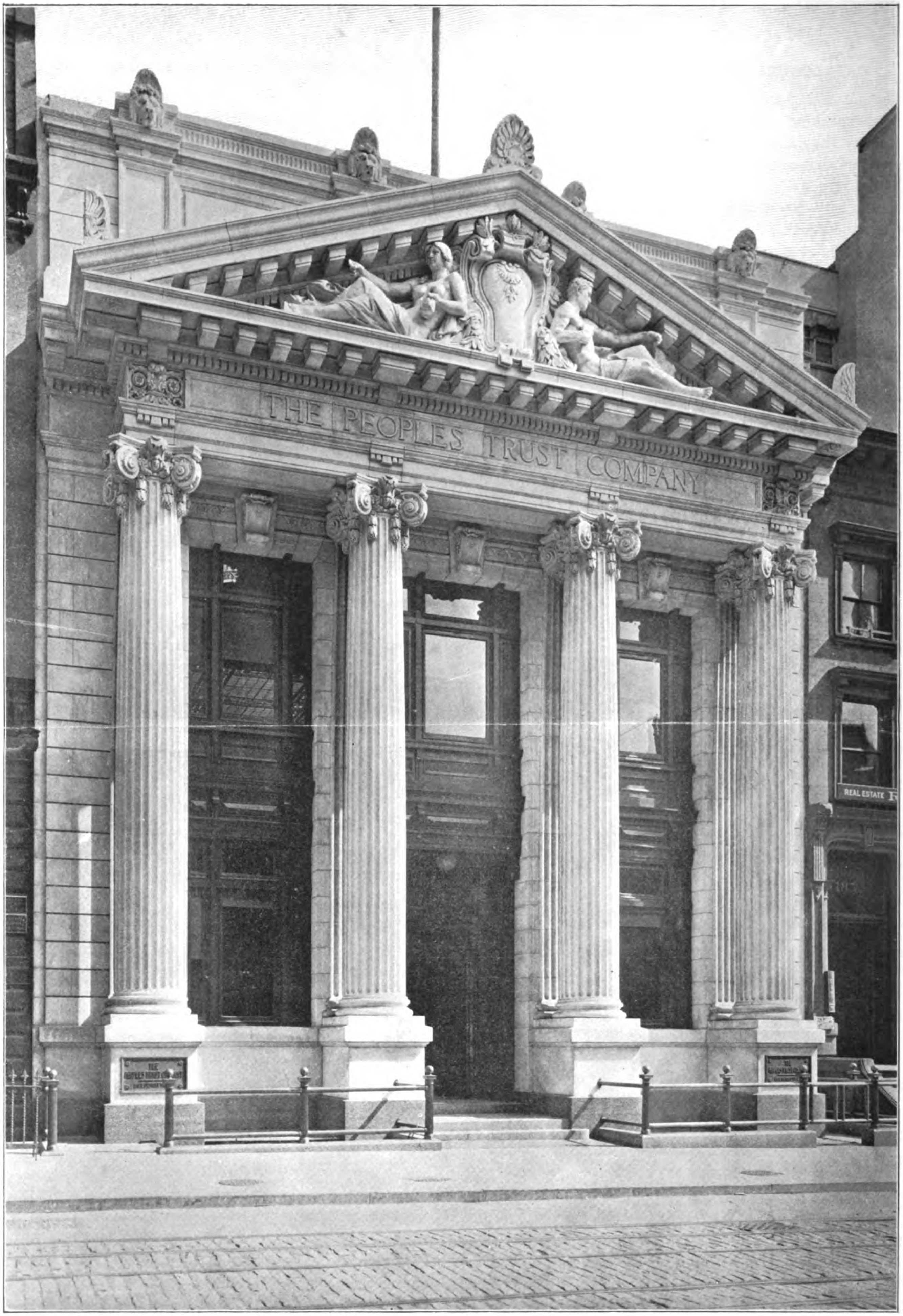
EXPLODING STOVE POLISH FATALLY BURNS WOMAN.

Newark, March 5.—Emma Barrett, 22 years old, employed as a domestic in the house of George Palmer, 213 South Tenth Street, was burned to death at 7:30 o'clock to-day by the explosion of stove polish which she was applying to the kitchen stove.

The explosion was followed by an outburst of flame, which enveloped the unfortunate woman, setting fire to her clothing. She screamed for help and when Mr. Palmer arrived she was hurried to the rear yard and rolled in the snow. She became unconscious before the arrival of a hospital ambulance and died as that vehicle arrived.—*The Observer, Jersey City.*

FORMULA FOR LUBRICATING SOAP.

A product suitable for lubrication consists of a mixture of soap or other saponaceous material, graphite, fluid extract of red elm bark, 2 parts of each; common salt or a suitable saline compound, 1 part, to prevent solidification under the influence of compressed air, and water, 4 parts. These ingredients are heated together to the boiling point, well stirred until the mass becomes plastic, and then moulded into a convenient shape and wrapped in metal foil, or other impermeable material.—*The National Provisioner.*



THE PEOPLE'S TRUST COMPANY, MONTAGUE STREET, BROOKLYN, N. Y.

MOWBRAY & UFFINGER, Architects.

STRUCTURAL STEEL WORK PROTECTED WITH DIXON'S SILICA-GRAPHITE PAINT.

Graphite

Vol. XI. MAY, 1907. No. 5.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

SHORT OF POSTAGE.

As we have been for sometime trying to educate ourselves, we will at the same time try to educate others by calling their attention to a statement made by Consul-General Samuel M. Taylor of Callao, Peru, calling attention to the prejudicial effects on trade by the failure of American exporters to place sufficient postage on their foreign business correspondence.

Mr. Taylor cites the following as an example which has lately been brought to his attention:

A gentleman received from a business man in the United States a letter which was short of postage. The entire subject-matter of the letter concerned the interest of the American; in fact it was a letter of inquiry. The gentleman who received and paid for it courteously answered with valuable information, but took occasion to make reference to the short postage which he had paid. His American correspondent wrote him a profuse letter of thanks and apology, assuring him that it would not happen again, yet the letter of apology was itself short of postage.

DO PEOPLE LIKE TO BE HUMBUGGED?

''A man who is trying to give genuine value has to beg people to listen; but the get-rich-quick scheme receives remittances by mail.''—*N. Y. Press.*

It often seems that a thing is popular in the inverse ratio of its reasonableness. The silliest doctrines and the most absurd investments appear to fascinate the multitude. We are careful to qualify with ''seems'' and ''appear''; but we would qualify the statements yet further by venturing that only to superficial observers does the world look so stupid.

Ralph Waldo Emerson, until late in life, did not realize an average of $3,000 a year. Alexander Dowie heaped up the millions in a little while. Dowie had the meteoric genius to delude and despoil several thousands of people. Emerson had the starlight genius that quietly enriches the minds of millions—more and more of them every decade.

All the great newspapers of France, a little while ago united to put the common sense of the French people to a severe test. Every Frenchman and every Frenchwoman was begged to return a coupon on which was written the name of the most popular Frenchman of the nineteenth century. More than eighteen million coupons were returned. It was practically a vote of all the grown people in the republic. The man who received the largest number of votes was no fake or demagogue, not even a writer or soldier, but the great scientist, Pasteur—the man who had given most genuine value to human life and happiness.

Even so, when you figure up the business that is done by a great manufactory of genuine goods or a great corporation that gives genuine service, the result will put your get-rich-quick scheme to the blush, and will emphasize the sober second thought which the people give to everything.

Let not the man who tries to give genuine value be discouraged. If his goods are new, then, for a little while, he must beg people to listen; but they will hear his honest word and they will remember, and his career will not be a sky-rocket sputter.—*Batten's Wedge.*

REMINCENCES.

Two Good Stories by Mr. Carnegie, and one by Mr. John A. Walker.

"One day Colonel Scott, who was my division commander, said to me, "Andy, do you think you could handle the Pittsburg division?" Well! I never was such a fool as to refuse anything if I had a chance to get it. When I was in the height of my exultation over the promotion Colonel Scott said to me, "Andy, how much salary do you think I ought to give you?" "Salary!" I cried. "What do I care about the salary? You just give me the division. I never cared so much for salary as I did for position."

"Mr. Carnegie told a story of his messenger days, when one Saturday he did not receive a salary envelope with the other boys. Visions of the loss of his job and disgrace came to him. Then Colonel Scott said to him: "Andy, you are worth more than the other boys. Instead of $11 a week I have given you $13.25." "Oh, oh, talk of your millions!" said Mr. Carnegie, as he chuckled over the thought of the joy that "raise" had given to him. He told how he ran all the way home to tell his mother."

That reminds me of a Saturday night some fifty years ago when my pay had been one dollar per week for 26 weeks and the boss, an old time German, said to me in broken English, "Schan, you haf bin a goot poy und I gif you ein dollar und a quarter next week." I ran home all the way excited and told my mother. —John A. Walker.

Dixon's graphite publications sent free upon request.

ESTBLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Black Lead.

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EDWARD F. C. YOUNG, WILLIAM MURRAY,
JOHN A. WALKER, EDWARD L. YOUNG,
GEORGE E. LONG, JOSEPH D. BEDLE,
GEORGE T. SMITH.

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DIXON'S CRUCIBLE MEETING.

Old Board of Directors and Officers Re-elected.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Company, held Monday, April 15th, the old board, consisting of Edward F. C. Young, John A. Walker, Edward L. Young, William Murray, George T. Smith, Joseph D. Bedle and George E. Long, was unanimously re-elected. The board of directors re-elected the former officers, namely, E. F. C. Young, president; John A. Walker, vice-president and treasure; George E. Long, secretary. Judge Joseph D. Bedle was also re-elected as counsel.

The stockholders present expressed themselves as thoroughly satisfied with the management of the company by its officers.

Of the total number, 7,345 shares, there were represented 6,460 shares.

JOHN A. WALKER'S ANNIVERSARY.

Just Forty Years Ago When He Entered the Crucible Company.

When Mr. John A. Walker of the Dixon Crucible Company entered his office this morning he remembered that exactly forty years ago he entered the firm of which he is now vice-president. My gracious! What a difference! Then the factory, on the corner of Railroad Avenue and Monmouth Street, was as big as the ordinary dog house, and to-day it is as big, as the vice-president defined it, "as all out of doors."

At that time James Gopsill was Mayor and ran the Republican machine with the aid of John Jenne, while Orestes Cleveland had the Democratic people in tow. Edward R. V. Wright was the Democratic member from Hudson in Congress. Charles H. Winfield, afterwards Prosecutor, was in the State Senate, and in the Assembly were Leon Abbett, afterwards Governor; Noah D. Taylor, A. O. Evans, John Dwyer. E. F. C. Young, now president of the Crucible Company, was then a young man, with hair not as white as it is to-day; but even at that time he was giving evidence of qualities which have brought him to the front to-day. What a happy place the old town was then! No political brain-storms, political mental explosions, exaggerated ego or dementia Jersey Cityana then reflected Mr. Walker. Had a man suggested investigating the water department, City Hall department or any hot air department, he would have been promptly squelched. But tempora, etc., etc., and as Mr. Walker surveyed to-day the big brick buildings where all sorts of things are ground up and made into lead pencils, without the lead, he rubbed his eyes and marveled.

During those forty years "John A.," as he is affectionately termed by his very many friends, has been a great factor in the city's progress. Politics found little attraction for him, his mind traveling towards literary matters, and when he was appointed to the Board of Education, and subsequently to the Free Public Library, for once the city magistrate didn't follow his customary practise of putting a square man in a round hole.

Beyond a few silvery hairs and perhaps a little portliness, time has dealt gently with Mr. Walker; and now, over the sixty mark, he is just as ready to trot over to Europe and scale the Alps, looking for graphite, as he is giving a talk to his beloved Cosmos Club on Chinese metaphysics, or any other simple topic.—*Evening Journal, Jersey City.*

DIXON'S graphite publications sent free upon request.

REDUCING PRESSURE VALVES.

By W. H. Wakeman.

Chapter I.

Valves for reducing the pressure of steam, water, air and gas, are now manufactured in large numbers, and in a great variety of styles, and sizes. Inventors have sought to perfect valves that will reduce pressures from the highest carried in general practise to any lower point that may be desired, and their efforts have met with success within certain limits, although all of these useful appliances are not equally efficient in the performance of duty.

Many working engineers do not understand the construction and operation of these valves, because they have not had charge of plants where they are a part of the equipment, and others are not familiar with them, although they form a part of the machinery in their care, because these appliances have given satisfaction in daily use, hence from the engineers' point of view it is not necessary to spend time in mastering subjects that they may never have use for. The fallacy of this argument has been demonstrated many times, because knowledge concerning the design and operation of these devices is frequently required at very short notice, and the engineer who has it ready for instant use, always has the advantage of one who has never exerted himself to obtain it.

Ignorance along this line causes engineers to condemn and discard many valuable appliances, to the loss and discredit of those who manufacture them, also to their own disadvantage.

An illustration of this practise in a case that came under my observation some time ago will be instructive to others.

A certain plant in which steam power was used to drive the machinery, was equipped with a heating system for use in the winter, in which exhaust steam was used as far as it would go, and live steam was taken to supply the balance. A reducing valve was installed for the purpose of lowering the boiler pressure to about 5 pounds for heating, and it was intended to operate automatically, but owing to a blunder of the enginneer the valve could not be used. Examination of the three following illustrations will make the error plain.

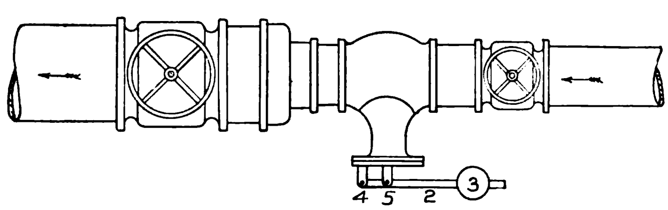


FIG 1

Fig. 1 shows the general arrangement of piping and valves for this purpose. Steam passes in the direction indicated by the arrows, coming to the reducing valve through a comparatively small pipe, and leaving it by means of a larger one, thus giving it a chance to expand in the greater area of pipe presented. This is an important feature of all such installations.

Two valves are necessary in order to shut off the reducing valve if it needs repairs, while the heating system is in operation.

The lever 2, carrying the weight 3 is hinged at 4, consequently the valve stem is drawn downward by the weight, thus holding the valve closed at all times, which is evidently wrong.

Fig 2 shows the same installation except that the bonnet of the reducing valve is reversed, therefore the lever 2 carrying the weight 3 is hinged at 4, consequently the valve stem 5 is forced upward by action of the weight, and the valve

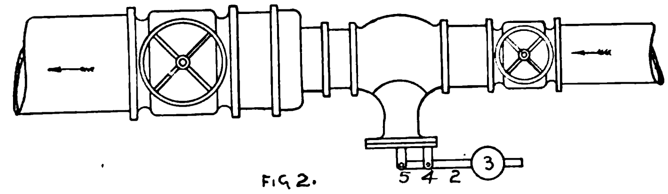


FIG 2.

would remain open were it not opposed by action of the steam, on the low pressure side, which is illustrated in Fig. 3. The valve is now open, but it should be remembered that only a small opening is required to let the steam through, as this differs from the service required of a throttle valve where it does not cause a reduction of pressure. Here there may be one hundred pounds or more on the inlet, and five pounds on the outlet, causing steam to travel rapidly at this point on its way to the heating system.

Suppose that the weight 3 is set for five pounds. When this pressure is realized it acts on the surface of the water which surrounds the valve stem and through it operates the rubber diaphragm 6, carrying the valve stem with it and partially or wholly closing the valve according to conditions, until the pressure is slightly reduced, when it opens again and thus maintains the desired pressure, near enough for all practical purposes, as absolute accuracy is not necessary for such work, and there must be at least a slight variation to operate the valve.

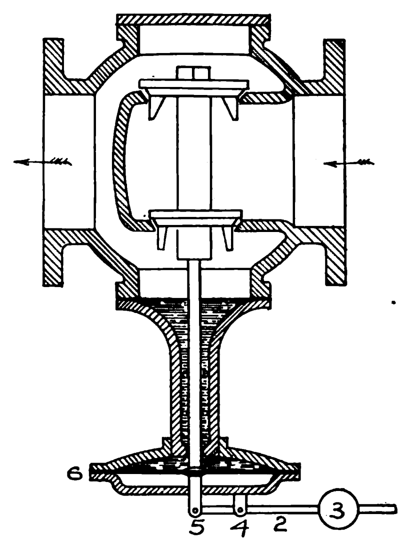


FIG. 3

Now if the valve in Fig. 3, is connected as illustrated in Fig. 1, the weight draws it to its seat and keeps it closed. If it should be raised by hand and steam admitted to the low pressure side it would act with the weight and not against it, as it ought to, thus holding it more firmly to its seat.

The rubber diaphragm 6 is always covered with water resulting from the condensation of steam, in order to protect it from the destructive heat of dry steam, and I have discovered another good point about this standing water that may not have been foreseen by the manufacturer. Every

time the valve stem moves, the diaphragm is bent, and as this is repeated thousands of times it is worn out in a few months and must be renewed, but before it fails entirely it allows some of this water to leak out, slowly at first drop by drop, and then faster until a break occurs, unless a new diaphragm is put in. This warning enables the engineer to make repairs before the valve fails entirely.

This is only a small job if properly managed, as the rubber and iron surfaces that come in contact should be covered with a thin coat of Dixon's fine graphite mixed with cylinder oil to the consistency of a thick paste. A fine grade is more

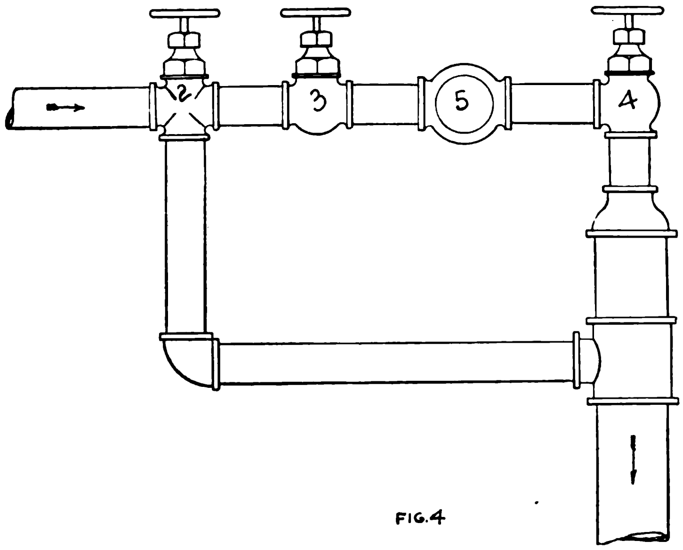


FIG. 4

satisfactory for this service than the coarse flake, as it adheres to the surfaces much better. It should be well rubbed down until the coating is thin and smooth, as there is no advantage in applying a thick mass of it.

In case it becomes necessary to take the valve apart for any reason, this graphite will enable the engineer to use the same diaphragm if it is in good order, instead of spoiling it and requiring a new one, and when it is worn out it will save time in renewing it because the joints can be quickly broken and the surfaces will be all ready to receive another coat of graphite and a new diaphragm, which is much better than to spend several minutes in removing old packing when the time for doing the work is limited.

In the above mentioned case, the pressure reducing valve could not be used owing to the fact that the bonnet had been taken off for some purpose and given one-half of a revolution before it was put back, but the heating system was used by means of the by-pass provided for an emergency.

Fig. 4 illustrates the plan view of an arrangement of piping including a by-pass that will give good results in practise. When the heating system is not in use the cross valve 2 is closed, also the globe valve 3 while the angle valve 4 is open. When steam is wanted 3 is slowly opened until the reducing valve 5 is in operation, when 3 is opened wide, which is all that it is necessary to do. To shut down the heating system it is only necessary to close 3. If the reducing valve 5 is disabled and the engineer wishes to cut it out, 3 and 4 are closed and 2 is opened, thus admitting steam through the pipes hown, but the pressure must be regulated by hand.

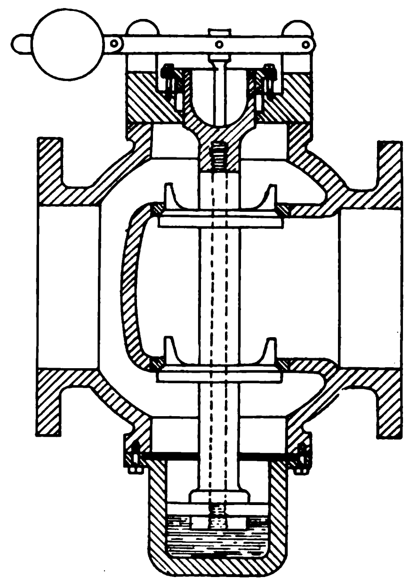


FIG. 5

Fig. 5 illustrates another pressure reducing valve that is adjusted by means of a weighted lever, but in this case it is above the valve and a dash pot is located below it. This prevents violent opening and closing of the valve under sudden changes in the pressure under which it operates. The weight opens the valve, and when the desired pressure is secured on the low pressure side, it nearly closes the valve and thus prevents further increase.

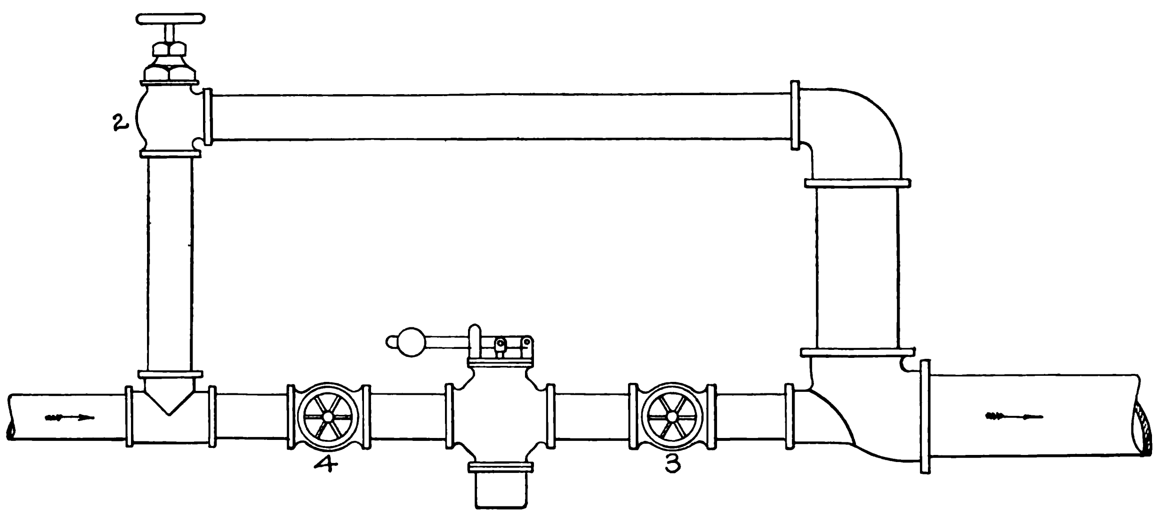


FIG. 6

Fig 6 illustrates a by-pass where this valve is used in a straight line of pipe. It is an elevation of the arrangement, which is recommended where there is plenty of head room. Ordinarily the angle valve 2 is closed and the globe valve 3 is open, while the steam is turned on and off by 4, but if the reducing valve is to be cut out for repairs, 3 and 4 are closed, and the system is operated by 2. This valve cannot be used where pressure must be reduced below 15 pounds, therefore it is not available for ordinary heating systems. There are many places, however, where steam at high pressure must be carried on the boilers to run certain parts of the plant, while a lower pressure is more suitable for other machines, therefore a reducing pressure valve is necessary. It cannot be done by a globe valve, because the demand for the steam varies, making it necessary to constantly change the adjustment and this would take too much time, although an extra man can be employed for this purpose when the automatic valve needs repairs and the by-pass must be used until they are completed.

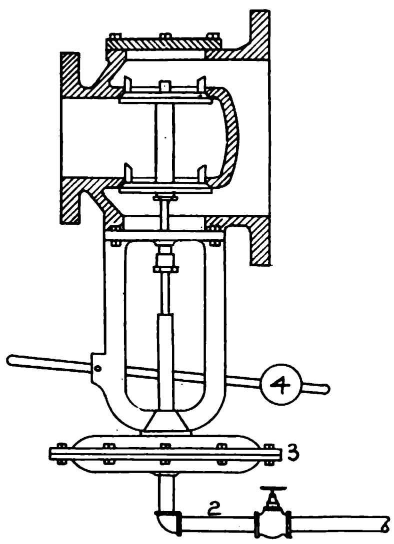


FIG 7

Fig. 7 illustrates a pressure reducing valve that is in direct contrast to Fig. 5, although it is adjusted by means of a weighted lever. This valve is used to reduce steam at a medium pressure down to, say, 2 pounds for a low pressure heating system, or to a point below the atmosphere for a vacuum heating system. It may be well to remind the reader that when the word "vacuum" is used in this connection, it simply means a pressure slightly below the atmosphere.

Steam at medium pressure is admitted through the left hand opening, and at greatly reduced pressure passes out at the right hand, which is greatly enlarged in order to avoid undue back pressure at this point. The enlarged area is provided directly in the valve, so that there can be no mistake about it on the part of a steam fitter who installs it.

The small pipe 2 below the valve is provided to convey the reduced pressure to the diaphragm 3, thus closing the valve above it before a high pressure accumulates. As this operates in direct opposition to the action of the weight 4, it is evident that the position of this weight on its lever determines the pressure that will be carried on the low pressure side. The diaphragm is made large in order to present an extensive area on which the low pressure can act, as otherwise the valve would not be closed. This device will maintain a very nearly uniform pressure in a steam heating system under normal conditions.

(To be continued.)

"ASSISTANT ENGINEER."

Among the other pleasant letters received we have one from the engineer of a large Western plant who writes as follows: "I have been a constant user of Dixon's Flake Graphite for more than twenty years and never take off a nut without painting the threads before replacing the nut. One of my acquaintances calls it my "Assistant Engineer."

LUBRICATION.

The question of lubrication is one that has been talked on probably more than any other in the mechanical field, and no doubt everybody is more or less familiar with this vital question.

The object of lubrication is to overcome one of the fundamental laws of Nature, and no doubt as many attempts have been made to get a frictionless surface as have been made to get perpetual motion.

The greatest difficulty encountered is friction. If it were possible to get a metal surface actually smooth, one that would not show minute irregularities under the microscope, then there would be no need of discussing the lubricating question. The nearest approach to this condition is a jewel-bearing, and that is the reason why watches have jewel-bearings.

It is a well known fact that if two pieces of glass are most carefully polished there will still be so many microscopic irregularities that when they are pressed together with sufficient power the minute irregularities will interlock and practically form one piece of glass.

The question of lubrication therefore resolves itself into getting something that will hold the parts away from each other. In most cases the bearing parts are metal. By many the idea is held that this something should be a fluid substance, but that will be discussed later.

Where a fluid is used as a lubricant there are two kinds of friction to deal with. One known as the friction of the parts themselves, and the other as the friction of the fluid. A good lubricant is one that prevents friction of the bearing parts. The friction of the fluid is recognized by authorities as of two kinds, either the motion between the outer and inner film is one of small globules, or balls rolling over each other, or else one of an infinite number of films sliding over each other. It is easy to see how the part of the lubricant next to the stationary part of the machine is at rest and the other part next to the moving part is in rapid motion, the same as a stream of flowing water where out in the middle the current is strong and next to the bank it is sluggish. The same condition exists in the film of oil which separates the journal and bearing.

It is the consistency of the lubricant at working conditions which determines just how much this fluid friction is. It is known technically as the viscosity, or rate of flow, compared with water as the standard. It would be readily seen that a lubricant with the lowest viscosity is not always the best, especially in the case of heavy machinery, because water has the lowest viscosity, but not body enough to hold the surfaces apart and keep them from seizing.

REQUIREMENTS OF A GOOD LUBRICANT.

1st. It must have sufficient body to prevent seizing of the parts with a minimum coefficient of friction.

2nd. Must not gum, dry, or be injurious to the parts lubricated.

3rd. Must have good heat-conducting qualities.

4th. The character of the work demands that within certain limits the lubricant must not vaporize, or stiffen through a certain range.

5th. Must be free from acids, alkalies, grit or other injurious agencies.

6th. It must be carefully selected for the particular work.

And this leads us to the subject of different kinds of lubricants, which are:

1st. Fluid.
2nd. Semi-fluid.
3rd. Solid.

In the fluid class we have the very thinnest of oils to the stiff steam cylinder oil.

In the semi-fluid class there are those lubricants which are solid under normal conditions, but liquid when at work, and this includes greases which have a range from soft vaseline to hard suet. Perhaps it might be well to mention a few of the advantages of grease lubrication.

1st. The grease being in a solid state does not drip and run all over when not in use.

2nd. When used on a bearing a ridge of grease forms at the edges which prevents dirt and grit from getting into the bearing surfaces.

3rd. It is for certain kinds of work more economical than oil, as it is used only when the parts heat up.

4th. It is a cleaner method than oil, which is an important factor in some lines of work.

Under the class of solid lubricants there are graphite, mica, talc or soapstone.

GRAPHITE AS A LUBRICANT.

There are two classes of graphite, flake and amorphous. Ticonderoga flake graphite gets at the real cause of the friction trouble, filling up all the minute irregularities and finally giving the bearing a thorough veneer-like coating of marvellous smoothness.

It has been found by experiments that Ticonderoga flake graphite as a lubricant alone will allow running for a long time (without a new supply), showing only a slight heating up of the parts, but no tendency whatsoever to seize; when oil and graphite were used the friction was less than with oil alone. Ticonderoga thin flake graphite is unaffected by either very high temperatures or low degrees of cold. It takes the high heat of the chemist's blow pipe to reduce it to ashes, and the residue is mostly mica in very thin flakes.

The other graphite is known as amorphous graphite, which shows on analysis about 85% graphite and the rest is mostly clay. This graphite will not attach itself to the metal in the manner that the thin flake will. When used dry it has a tendency to pack in hard balls (a thin flake cannot, as the flakes will slide over each other). Amorphous graphite when used with oils forms pasty balls which will fill up oil holes and cause no end of trouble.

Mica as a lubricant is far inferior to any form of good graphite and is used only for rough heavy work. When taken between the fingers it doesn't have the soft, oily feeling that graphite possesses.

Soapstone and talc have no special lubricating value other than for heavy work where large quantities have to be used. Indeed, they are very detrimental in most cases when used as lubricants.

Flake Graphite has long occupied an important place as a lubricant in railway work, and engineers are very ready to tell how they have long carried a supply in their cab and give experiences of where it has cured hot bearings, when all other means have failed. In fact, engineers argue that what will cure will be a preventive, and so do not give their bearings a chance to heat up or their pumps a chance to groan.

It has been found that when finely pulverized Ticonderoga flake graphite is properly mixed with pure vaseline in the right proportions and used as a lubricant for the air brake system, the triples are more sensitive to the reduction of pressure than when any other lubricant is used, and this has resulted in the preparation of a special graphite grease for the air brake system.

"FIREPROOF PAINT."

Anything Else but Fireproof.

The New York *American* prints an account of an explosion of a keg of paint and oil into which a porter carelessly threw a lighted match, causing a fire loss of $50,000 and the death of an employee.

The strange part of the case is that the paint was made especially for fireproof goods and was being drawn from the keg for a customer when the match was thrown into it.

If the number of injuries and deaths that are caused from dangerous stove polishes, paints, etc., each year were tabulated it would cause much astonishment.

If the time ever comes when the people will buy goods only from well known firms who will guarantee their goods to be as represented, then and then only will we be spared the reading of such accounts.

ELECTRO-PNEUMATIC SIGNALS.

And the Proper Lubricant for Them.

The following letter comes to us from the supervisor of signals of one of the large Eastern trunk lines and shows how satisfactory Dixon's Air Brake and Triple Valve Grease is for lubricating the delicate parts of the electro-pneumatic signal system. We do not know whether or not the supervisor would be willing for us to use his name for publication, but do not feel at liberty to do so at this writing.

Joseph Dixon Crucible Company,
Jersey City, N. J.

Dear Sirs:—We have been using Dixon's Air Brake and Triple Valve Grease for the lubrication of buffer cylinders of motor signals, and thus far it has been entirely satisfactory. We have not as yet had any experience with it in cold weather, but believe it will be all right. We are now trying it in air cylinders of electro-pneumatic signals. We have nothing to do with the operation of air compressors, and therefore have not tried the grease in cylinders as you suggest. After we have had a little more experience with the grease, I will be very glad to inform you of results, and would have no objection to your calling attention of other supervisors of signals to the fact.

Yours truly,
Supervisor of Signals.

DIXON'S graphite publications sent free upon request.

A SOCIETY OF AMERICAN MAGICIANS.

It may be an interesting bit of news to our readers to know that there is a society in the City of New York known as the Society of American Magicians. The society has a membership of several hundred. The membership is made up of professional magicians, amateur magicians and lover sof magic. Among the amateur magicians and lovers of magic, who are also eligible as full members, there are many well known scientists, professors, doctors, lawyers and authors. The membership of the society extends to all parts of the civilized world.

The study of, and the interest in magic by professional men is far greater than is generally supposed. It includes the study of what are known as illusions, malobservation, misdirection, so called mediumship, ingenious mechanism, sleight of hand, and the art of entertaining deception generally.

EN VOYAGE.

Whichever way the wind doth blow,
Some heart is glad to have it so;
Then blow it east or blow it west,
The wind that blows, that wind is best.
My little craft sails not alone;
A thousand fleets from every zone
Are out upon a thousand seas;
And what for me were favoring breeze
Might dash another, with the shock
Of doom, upon some hidden rock.
And so I dare to pray
For winds to waft me on my way,
But leave it to a higher Will
To stay or speed me; trusting still
That all is well, and sure that He
Who launched my bark will sail with me
Through storm and calm, and will not fail,
Whatever breezes may prevail,
To land me, every peril past,
Within His sheltering heaven at last.
Then, whatsoever wind doth blow,
My heart is glad to have it so;
And blow it east or blow it west,
The wind that blows, that wind is best.

—CAROLINE MASON.

THE DEVELOPMENT OF THE SOUTH.

We are advised that the *Manufacturers' Record* in its issue of May 9th will publish the story of the South's development during the past ten years, a period of notable and marked achievement; as, for instance the South increased its cotton spindles to 6,067,000 during that time; its railroad mileage increased to 16,000; it produced over 103,000,000 bales of cotton; 120,000,000,000 feet of lumber; nearly 600,000 tons of coal; over 27,000,000 tons of pig iron, and of corn, wheat and oats over 7,000,000,000 bushels.

This general advance can be better understood when we remember that the South is adding to its wealth at the rate of $7,300,000 per day, while England is only adding $7,000,000 per week. This will give you a basis of comparison.

"NOT GOOD TO HUG."

We have the following letter from a man who has evidently bought a gold brick or been given a lemon. The Dixon Company does not manufacture this belt dressing and it was not the Dixon agent who called on the gentleman. Nevertheless, the letter is interesting and the moral easily discovered.

"Your agent called upon us 2 weeks ago and wanted us to By some Huget Belt Dressing and he told us that he had Huget that would beat anything in the world and he told us that if the Huget Belt Dressing was not what he Represented that we could Return some and would not cost us 1 cent now we lost about 100 Dollars trying to Keep the Belts on the Pulleys by using Some we don't think that it will Pay your agent to be telling such things when it is not so we Paid 50 cents for Express and now we would not take it for nothing as it is no good to hug this is the first thing we bought of agents for a long time and it will be the last. Please advise us how to ship it back."

DIXON'S No. 7774 GRAPHITE.

For Polishing Front Ends of Engines and for Protecting Them From Rust and Corrosion.

The foreman painter of one of the big trunk line railroads advises us that he is using Dixon's Graphite No. 7774 with much satisfaction for protecting the front ends of the engines from rust and for keeping them in an attractive condition. He mixes one-third of dry lamp black to two-thirds of Dixon's 7774 Graphite in bulk. He mixes to a thick paste with good raw linseed oil and a little dryer and then with more linseed oil to a consistency that covers well.

He states that some painters use signal oil, but his experience with signal oil has not been very satisfactory as the life of the oil was burned out too soon and the graphite then became as dust and fell from the iron. He then tried mixing with lamp black and linseed oil and dryer as above and the result has been so satisfactory that he has been using it ever since, and after nine months experience he finds that the linseed oil gives better body and is more elastic than signal oil and the lasting quality far greater.

He has no trouble whatever with the above mixture caking or carbonizing on the iron. The engine fronts are painted once every three or five weeks unless the engines have been in a very severe rain storm, which of course means greater wear on the paint than when under ordinary conditions.

On the under parts of the extension which are not subjected to great heat he merely rubs the material on almost dry and then brushes over the parts to give them gloss.

CARBON DEPOSITS.

Many automobilists who attend to their own cars complain about having trouble with carbon coating the compression chamber to an alarming extent. The writer has run automobiles for seven years and he has not experienced the least trouble from carbon deposits. He uses Dixon's flake graphite with the lubricating oil, which gives the surfaces a smooth, glossy appearance. Carbon does not stick to that surface. We recommend this remedy for sufferers from carbon deposits.—*Automobile Magazine.*

DIXON'S graphite publications sent free upon request.

FACTS, FIGURES AND FANCIES FOUND IN NEW YORK.

New York City is the terminal for twenty-five railway lines.

The number of arrests in New York city for violation of laws of the road and speed ordinances have been increased fifty per cent in the last three months.

At the present rate of progress New York city will be the art centre of the world before this century is half finished, for the treasures of the world's galleries and museums are being brought to Manhattan Island.

A visitor to New York from Boston last week said he received considerable light on metropolitan conditions when a keeper of a restaurant in "the great white way", in answer to a gentlemanly criticism, said: "We prefer to have disreputable persons for patrons. They spend more money."

The most densely populated blocks in New York city are those covered by the old tenements, and among the worst of these are the ones in the neighborhood of Cherry and Monroe streets, where there are 1,450 persons to the acre.

Comparatively few arrests are made by the police of New York city for grave crimes. The records show that nine-tenths of arrests are for petty offences, intoxication, disorderly conduct, violation of corporation ordinances and the like.

Real estate in New York city is valued at $5,800,632,132, according to the figures of the assessor.

During the last year New York city averaged four new churches each month.

"There are four fool things that New York has done in its subways that are big mistakes and the causes of much unnecessary delay in operating the lines," said a man from London, last Friday, when he made his first trip from the Bridge to Harlem. "The first is having stations on curves; second, making station platforms too short for increased train lengths; third, making the entrances and exits of cars at the same points, and fourth, and worst of all, making tracks cross each other at Ninety-sixth street."—*N. Y. Herald.*

THE SAVINGS BANK HABIT.

The man with the savings bank habit, says Elbert Hubbard, is the one who never gets laid off; he's the one who can get along without you, but you can't get along without him.

The savings bank habit means sound sleep, good digestion, cool judgment and manly independence. The most healthful thing that I know of is a savings bank book; there are no microbes in it to steal away your peace of mind. It is a guarantee of good behavior.

HIS MAJESTY'S WONDERFUL MEMORY.

At the age of sixty-one King Edward began to study that difficult language Hindustani, and with such effect that at a review of Indian troops at Buckingham Palace he addressed the soldiers fluently in their native tongue. The possession of a really wonderful memory has no doubt largely contributed to the King's success as a linguist. He never forgets anything. He recalls faces and names with unerring accuracy. Whoever is presented to him, no matter how great or how humble a personage, or under what crowded, changing surroundings, he is able to recall the exact circumstances of the presentation years afterwards. The implanting of this facility was a hobby of Queen Victoria's. In his boyhood days on her instructions, the King was made to repeat to his tutor every night before going to bed the names of the people he had met during the day and the circumstances under which he had met them.—*M. A. P.*

"CAN'T GET ALONG WITHOUT IT."

It does us a world of good to get letters, as we do, direct from engineers of large plants; saying they cannot get along without Dixon's Graphite and asking for pamphlets or information how they can make even more use of it.

It isn't always that an engineer can easily find the necessary pen or pencil or paper, and we therefore all the more appreciate his efforts.

We want to be close to the engineer, whether stationary or locomotive or marine. He has always been friendly to Dixon and we believe Dixon has been helpful to him and saved him time, trouble and money. Long live the engineer!

HOW A ROUND HOUSE FOREMAN TESTED DIXON'S AIR BRAKE AND TRIPLE VALVE GREASE.

A round house foreman of a large Eastern trunk line applied Dixon's Air Brake and Triple Valve Grease upon the engineer's brake valves of several engines. He did this unknown to the engineers, and in conversation with some of them later asked how the brakes were working. In each case the answer was that the valves had never worked so easily.

Dixon's Air Brake and Triple Valve Grease has just the right proportion of Ticonderoga flake graphite incorporated in the best vaseline that can be purchased.

Air brake inspectors are very enthusiastic over Dixon's Air Brake and Triple Valve Grease, and we are proud of the remarkable service given. Should any railroad men be unfamiliar with this grease, we are willing, and will be glad, to send samples to anyone who will make a test.

It will be found that the grease will last longer than any other lubricant and the delicate working parts will be in better condition than when any other lubricant is used. Another important factor is that the triples do not have to be cleaned so often.

My duty 'tis the world to teach
  Just how things should be run.
I go ahead and make a speech
  And feel my duty's done.

—***Washington Star.***

DIXON'S TICONDEROGA FLAKE GRAPHITE.

Its quality has made it the standard of the world.

Inventors throughout the world have vied with each other to produce the best device for feeding Dixon's Ticonderoga Flake Graphite.

Such devices are in successful use and have proven the claims made by men in high authority and reputation, that Dixon's Flake Graphite is without an equal as a lubricant and as a factor in better economy.

Under the influence of Dixon's Flake Graphite machines run better, run smoother, last longer and there is less cost of lubrication, less wear, less trouble, less time wasted, and oftentimes less profanity.

LARGEST THINGS IN THE WORLD.

The largest bank in the world is in London.

The largest church is in Rome.

The largest Stock Exchange is in New York.

The loftiest structure in the world is in Paris.

The largest brewery is in St. Louis. There, also, is the largest tobacco factory in the world.

The largest suspension bridge is in New York.

The largest hospital in the world is in Paris.

The largest stone structure in the world is in Egypt.

The largest falls are in Africa.

The largest public gardens are in Paris.

The largest river is in South America.

The largest monument in the world is in Washington.

The largest life insurance companies are in New York.

The greatest stove factory is in Detroit, Mich.

The largest match factory is in Ohio.

The largest gun works in the world are in Essen.

—*N. Y. Herald.*

GRAPHITE FOR GASOLINE ENGINES.

The following letter comes to us and will prove of interest to gasoline engine owners and operators. The writer did not state whether or not we might use his name, so we do not feel at liberty to give it.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Dear Sirs:—I received the samples of your graphite in due time. I used the Graphite No. 2 in my stationary engine. Before I used your graphite in my engine, the water would get hot in an hour when I sawed wood. Now I can saw from 3 to 4 hours and the water is only warm. I have not tried Motor Graphite yet. I think that graphite for a gasoline engine is the only thing to keep the engine cool.

Can I get motor graphite in Des Moines, Iowa, or will I have to send to the company?

The gears of my auto are noisy and I would like to know how I can stop it.

Yours truly,

PLUTARCH'S MAXIMS.

"There is no beginning so mean that continued application will not make it considerable."

"A good pilot is apprehensive of a storm when the sea is most smiling."—John A. Walker.

AN ENVIABLE RECORD.

The question is often asked us, "How long will Dixon's Graphite Wood Grease last in the gear box." This question is one that is easily asked but is rather difficult to answer and depends on many conditions, such as the amount of service given the car, condition of the gears, and kind of service.

Then again, somebody asks, "Won't this grease stiffen up and not lubricate properly." We have before us a letter from Mr. D. F. Graham, which will cast some light on these questions.

Mr. Graham is general superintendent of one of the well known makes of cars, and his views are certainly worth considering.

Gentlemen:—I received your favor of February 5th, also copies of your pamphlets. I thank you for same.

I used your Graphite Lubricant No. 688 in the gear case of my car which has plain bearings, and sliding gear transmission. In a run of 4800 miles I added, in addition to the first filling, not over three pints of Dixon's 688 and at the end of the run it seemed as if I had more grease in the car than when I started, and bearings and gears were in excellent condition. You are at liberty to use my name at any time you wish.

Sincerely,
(Signed) D. F. Graham.

A FINE "FIREPROOF PAINT."

It is Touched off With a Match and the Explosion Kills a Man and Causes Loss of $50,000 by Flame.

St. Joseph, March 9.—The explosion of a keg of paint and oil, from a lighted match which a porter carelessly threw into it, caused a fire loss of $50,000 in the store of Furbeck & Hurt.

N. A. West, an employe of the firm, was killed. The paint is made especially for fireproof goods, and was being drawn from a keg for a customer when the match was thrown into it.

The stock of the American Electric Company, in an adjoining building, was damaged to the extent of $15,000.

—*N. Y. American.*

LOGICAL ENGLISH.

I paused to talk to a fishmonger. "Fishmonger," said I, pleasantly, "why do you fishmong?"

He answered with a cordial smile: "I fishmong because my father fishmang before me."

"And have you been fishmonging long?" I asked further.

"Yes," was the reply. "I have fishmong for seven years come Michealmas."

"You are a worthy fishmonger," I responded, "and I'm sure you always mong the best of fish."—*Life.*

LUBRICANT FOR DISK CLUTCHES.

To avoid dragging when a multiple disk clutch is released, the plates must run in a bath of oil, and this oil must be squeezed out before the clutch can take hold. The wider the contact surface of the disks, the longer will it take the oil to work in and out, and for this reason a contact width of from $\frac{3}{8}$ to $\frac{1}{2}$ inch appears to be preferred, the necessary driving ability being obtained by multiplying the disks. With all multiple disk clutches a very thin oil is necessary. Spindle oil is generally recommended, but even this may be thinned with kerosene. Excellent results are obtained in some clutches by the use of simple kerosene having a little graphite mixed with it. Other users obtain good results from the dry flake graphite, no oil at all being used but a little of the graphite being shaken into the clutch every day or two. Of course, oil can only be dispensed with if the clutch is provided with ball bearings throughout. In this connection it may be mentioned that a slight amount of warp in the clutch plates, such as may appear from wearing away of the tough skin on the surface of a rolled steel plate, is not necessarily objectionable, since it aids the plates to separate and admit oil between them on release. Only a very slight amount of spring of this sort can be permitted, however.—*Motor Age, March* 21-07.

THE EIGHT WISE STEERS.

Some fifty years ago, when the first sawmill was built on the Waccamaw River, S. C., a cargo of mill supplies was shipped from Searsport, Me., together with four yoke of oxen. When the schooner came to anchor, there being no landing facilities, the cattle were jumped overboard, and all swam ashore to a grass plot on the bank of the stream, the idea being to allow them to rest and recuperate before being put to work. Imagine the surprise of the crew that night, all below at supper, when the cook rushed into the cabin yelling: "Cap'n, Cap'n! The cows be all comin' off to the ship, again!" And sure enough, there were the eight oxen circling around the ship, clamoring, as it were, to be taken aboard again. Was this nature or instinct?—*New York Press.*

ORIGIN OF WORD "TIP."

The waiters of a certain London coffee house more than a hundred years ago put up a collection box in a conspicuous corner of the room in which the patrons used to deposit their pennies for the waiters, in recognition of good service. This box bore the legend, "To Insure Promptness," which was subsequently abbreviated to the initials "T. I. P."

—*Chicago American.*

Love on! thy far-off children shall possess
That flying gleam of rainbow happiness:—
Each wish unfilled, impracticable plan,
Goes to the forging of the force of man:—
Thro' thy blind craving novel powers they gain,
And the slow Race developes in its pain:—
See their new joy begotten of thy woe,
When what thy soul desired their soul shall know;—
Thy heights unclimbed shall be their wonted way,
Thy hope their memory, and thy dream their day.

—FREDERIC W. H. MYERS.

B. ALTMAN & CO'S DEPARTMENT STORE,

Fifth Avenue—Thirty-fourth—Thirty-fifth Streets, New York City.

THE MOST ELEGANT DEPARTMENT STORE IN THE WORLD,

Exterior Finish of Delicately Toned Limestone Brought From France.

TROWBRIDGE & LIVINGSTON, Architects. POST & McCORD, Steel Construction. MARC EIDLITZ & SON, Builders.

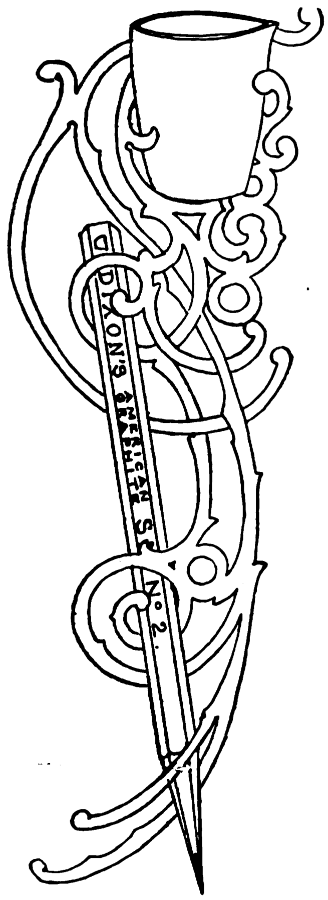
Structural Steel Work Permanently Protected With

DIXON'S SILICA-GRAPHITE PAINT, DARK RED AND OLIVE GREEN COLORS.

Graphite

VOL. XI. JUNE, 1907. No. 6.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



TERMS OF PAYMENT.

The following circular, issued by the M. B. Schenck Company, Meriden, Conn., states in a clear and businesslike fashion the terms on which their goods are sold, explaining among other points the conditions on which the discount for cash in ten days will be allowed. It it thus calculated to inform the trade in regard to good business practise and to correct the very serious laxity which permits merchants not infrequently to deduct the cash discount in remittances made after the ten days have elapsed:

All prices, aside from contracts fully specified, are subject to change without notice. All contracts are liable to cancellation when terms are not complied with.

TERMS OF PAYMENT.

Our net terms are invariably 30 days.

If remittance is actually mailed within 10 days from date of bill a discount of 2 per cent. will be allowed. Otherwise payments must be made within 30 days for full amount of bill.

Delay in deliveries will not be considered in the time allowance for the 10-day cash discount. Remittances not conforming to this will in no case be accepted.

Actual freight to destination, not exceeding 50 cents per 100 lb., allowed.

Positively no freight allowed on less than 150 lb.

Errors, shortages, &c., or the nonarrival of freight bills, need not enter into the 10-day cash problem. We will promptly remit for such freight bills or errors, on receipt of proper notification.

In other words, we desire to remove every alleged obstacle to prompt payment of bills according to our terms, which we make invariable.

Deliveries will be made with utmost promptness possible under the circumstances. We have recently added nearly 100 per cent. to our facilities and must keep on adding to keep up with the demand for our goods.

The enforced carrying of immense stocks of all kinds, from three to six months in excess of all ordinary requirements, in order to avoid dangerous delays in filling orders, the additional delays in deliveries of same to us, and the exceedingly narrow margins of profit on which we do business, forbid the taking of any liberties whatever with our terms of payment.

The limiting of prices in orders sent us should be omitted, unless of importance. It makes no difference whatever to us, but may waste valuable time to our customer. Prices for the time being are invariable and always as low as they can be made.

This notice is sent to every customer, although a very large share of them observe our terms with gratifying promptness. They have exactly the same conditions to meet as all our customers, and they never had occasion to complain of any variation by us from the "square deal."—*The Iron Age.*

HIS NAME WAS ANANIAS.

Uncle of an American Traveler Died Suddenly.

It was in the commercial room of a Midland hotel. Longevity was the subject of conversation, when a gentleman—whose nasal twang pronounced him as from across the Atlantic—joined in with the remark:

"I guess the climate of this island is dead against a long innings."

There were sounds of dissent. The American ignored the interruption and continued:

"Now, the American climate is somethin' like a climate. Kind of makes you live, want to or not. Why, my great uncle Jake from Montana'll be ninety-four next fall, but you'd never think it to see him jump on and off his bicycle when he's going down South to see his old people.

My aunt Mima—she's seventy-six, and junior golf champion of Fresno. Great snakes! she's a peach of a player for a junior; got another year or two over her head and she'll be frightenin' some of the older players, I can tell you. Yes, there's been a lot of us brought up in Montana, but I can't call to mind any one of 'em handing in their checks before they'd passed the century."

"I fancy," said a quiet man, who was smoking a cherry-wood pipe, "that I've read somewhere of one of your relatives dying comparatively young and somewhat suddenly."

"My uncle 'Zekiel got damages from the Montana *Eagle* for publishin' a false account of his death; perhaps that's what you're running your head up against," said the Yankee.

"No," replied the quiet man, "It wasn't your uncle 'Zekiel, and it wasn't in the Montana *Eagle*. The account I read was a true one. It was in the 'Acts and Apostles,' and had reference to your uncle Ananias."

DIXON'S graphite publications sent free upon request.

WORLD-WONDERS UNDER BUSINESS MEN.

King Edward, of England, says John A. Walker in a recent article, is a business man; Emperor William of Germany is pre-eminently a business man. The late Russian-Japan War was a business war, Russia wanting a business foot-hold on the Pacific, and Japan preventing it. The able young men are all flocking to the business standard. They equip themselves in law to be useful to a big industry. They equip themselves in engineering to join some big traffic system. The great men of the day are business men; people most in the public eye are important business men. Now for the first time comes light on the economic problem, and more progress has been made in individual well-being in the last half-century, under the business regime, than in all the centuries together, under conqueror, priest and lawyer. Now wealth begins to multiply.

USE OF GRAPHITE BRUSHES COMMENDED.

In the March issue of *The National Engineer* I note the treatment that Texas (Sherman, Texas) gives for carbon brushes, for commutator and brush faults. His treatment may be all right, but I would like to suggest another one.

Where I am employed we have about 18 or 20 motors, ranging from 2 H. P. to 50 H. P., direct current 220 volts. We had considerable trouble with the brushes; frequently we had to shut down, owing to violent sparking, and sandpaper the commutator. I might add that most of these motors run from Monday morning to Saturday night without stopping. These occasional shut-downs meant a serious loss to us.

Finally we put on graphite brushes and our trouble ended at once. This was about two years ago, and we have not had to touch the commutator since. Every engineer knows that graphite is a good lubricant, therefore the brushes need no lubrication; so the motors will run smooth and absolutely without sparking and need very little attention. It is with some reluctance that I write this, but I trust that it will help some engineer in his manifold troubles and perplexities.

De Kalb, Ill. MOTORS.

TO CLEAN AN AUTOMOBILE CHAIN.

To clean a chain, remove it from the car and, after wiping all surplus grease and dirt that can be removed with some waste or old rags, immerse it in a pan containing gasoline or kerosene—preferably the former, if quick results are desired. After letting the chain soak long enough to loosen the dirt on it, shake it in the fluid, or, if necessary, brush it with a coarse brush, until it is perfectly clean and every link works freely. If very dirty, a final rinsing with gasoline —whether this fluid or kerosene is used for the first bath— will expedite matters. When the chain is dry, it must be lubricated, preferably by working it around in a molten mixture of tallow and graphite—a compound that is to be had of any dealer in automobile supplies. In this way a sort of a bushing of graphite is worked into each joint, where it will remain and lubricate for thousands of miles.

—*The Automobile.*

NOTE:—The Joseph Dixon Crucible Company make a graphite compound especially for lubricating automobile chains.

PRESSURE REDUCING VALVES.

By W. H. Wakeman.

Chapter II.

Fig. 8 illustrates another valve that is partially controlled by a lever and weight. When the valve is not in active use the weight holds it wide open, and it follows as a natural consequence that if for any reason the initial or high pressure falls until it is only equal to or below what the secondary or low pressure ought to be, the valve will open wide for the free passage of steam, air or anything else that it may be used to control, provided the full volume or capacity of the valve is required, but when the initial pressure is raised, bringing the reduced pressure up to the required point, it passes into the small pipe shown, and acting on the diaphragm partially closes the valve and thus maintains the required pressure.

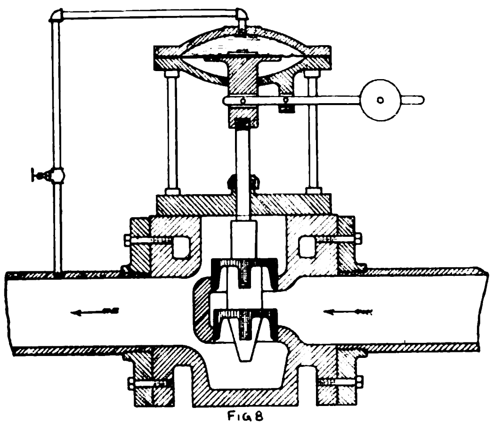


Fig 8

Whenever it is desired to pass steam through the main pipe at full boiler pressure, the valve in this small pipe is closed, thus preventing pressure from acting on the diaphragm, consequently the valve remains open. The location of this pipe prevents water from collecting in it, as all that results from the condensation of steam drains back into the main pipe, but water does stand on the diaphragm, thus protecting it from the high temperature of steam which would soon destroy it. After the top of this or any similar valve has been taken off for any purpose, allowing all of this water to escape, it is a good idea to turn on steam slowly and allow water to collect on the diaphragm and cool before the full pressure of steam can be brought to bear on it.

Before a new diaphragm is put in, both sides of it, where it comes in contact with iron, should be completely covered with Dixon's Graphite, ground fine and mixed with cylinder oil until it forms a thick paste. Care should be taken to see that there are no places left uncovered with the mixture, for if even a small part of the rubber comes in contact with iron, it may stick to it and thus cause the diaphragm to be spoiled when it becomes necessary to remove the cap again, whereas if the surface is completely covered it can be removed several times without injury. All of the iron that is in contact with water should also be coated with this mixture, as it prevents rust and corrosion.

This valve should be placed so that steam will pass through it as indicated by the arrows, and when so connected it will take steam at 200 pounds pressure, and reduce it to one pound, or to any higher pressure not exceeding 75 pounds. The reduced pressure is determined by the position of the weight on the lever.

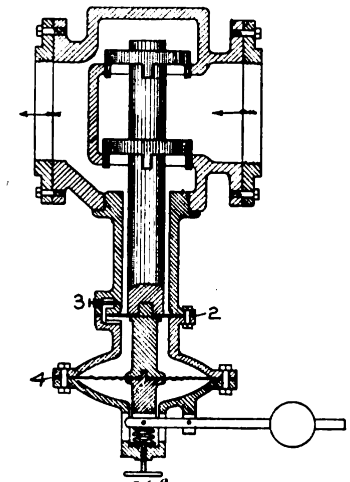


Fig 9

Fig. 9 illustrates a diaphragm reducing valve without a separate connection. Steam enters at the right hand as indicated by the arrows, and the valve remains wide open until the desired pressure on the left hand side is secured. Water resulting from the condensation of steam falls into the space around the main valve stem, and rests on a diaphragm shown at 2. This is not sufficient to close the valve, as the exposed area is small, but a small valve is located at 3, and when it is opened water passes through the passage thus provided and rests on the larger and more flexible diaphragm 4. This forces the valve downward against the action of the weighted lever shown, and prevents excessive pressure from accumulating on the low pressure side.

The reduced pressure is made more or less by shifting the round weight, also by adjusting the hand wheel in the lower part of the casing. If the pressure changes rapidly, causing the lever to vibrate, it can be prevented by partially closing the small valve 3 which acts as a regulator. The vibration

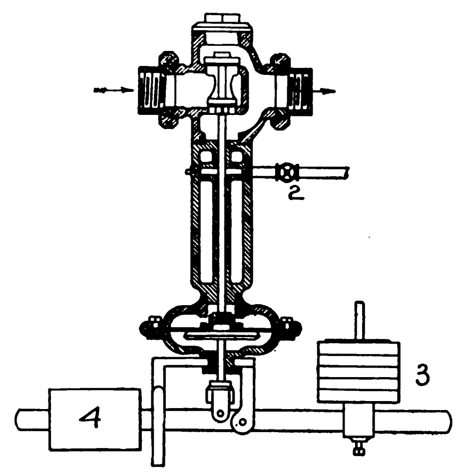


Fig 10

of such a lever and consequent movement of the valve causes an unpleasant noise, which may not be decidedly objectionable in a mill or shop where the regular work causes enough noise to partially or wholly drown it, but in a school or an office building, where the occupants are usually very quiet, such a noise cannot be tolerated.

Fig. 10 illustrates a pressure reducing valve suitable for pipes 3 inches and less in diameter. It is always necessary to locate this kind of a valve in a horizontal pipe with the stem in a vertical position as illustrated. In practise steam is admitted as shown by the entering arrow and passes out on the opposite side to the low pressure system. At a point about 15 feet distant from the reducing valve, connection is provided for a small pipe, the delivery end of which is connected into the valve at 2, which is provided to shut off the pressure when necessary. When the required pressure has accumulated, it acts on the large diaphragm and forces it downward against the action of the weights 3 on the lever, as shown. More or less pressure, as required, is secured by putting on or taking off weights, but the valve is not intended to give more than 25 pounds on the low pressure side. When the low pressure is to be nearly down to zero, the square weight 4 is added to make the machine work steadily. We naturally ask why it is not just as well to remove all of the weights at 3 and thus secure the desired light pressure. The reason why this plan will not work as well as to add weight at 4 to counterbalance those at 3, is that the inertia of a machine must be overcome before it will start from a state of rest, or stop after it is put into motion. Application of this principle makes this reducing valve comparatively slow to act, which is a desirable quality, for if it was otherwise, the changes would take place too quickly, causing the lever to vibrate badly, for inertia is that property of matter which causes it to resist change of condition, or in other words to be slow to move when at rest, and not quick to stop when in motion. This property does not prevent it from operating quick enough to maintain an even pressure, but does keep it from violent fluctuations.

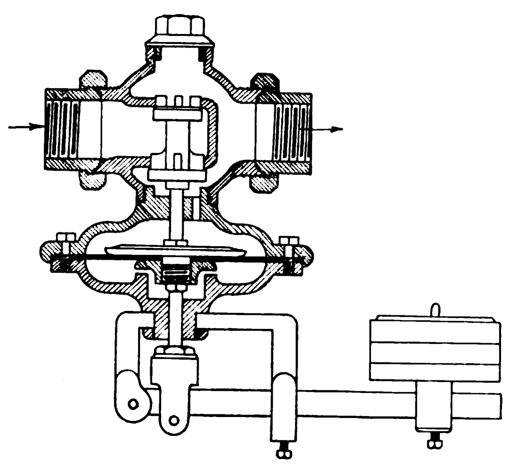


FIG. 11

Fig. 11 illustrates a reducing valve for a rather peculiar purpose, as it is designed to be used on a vacuum heating system, not to regulate the whole of it, but to control a branch line where the same degree of vacuum is not desired on all parts of the system. For illustration suppose that on the main part of a vacuum heating system it is desired to carry 10 inches of vacuum, but on one a branch line only 3 inches are wanted. In this case the reducing valve would be placed between the branch system and the vacuum pump.

In order to understand the operation of this valve, the principle on which a so-called vacuum heating system depends, should be considered. The total pressure of steam is always the gauge pressure plus the atmospheric pressure, whatever the latter may be. At sea level it is nearly 15 pounds, and for convenience in making calculations, where great accuracy is not required, it is customary to call it 15, therefore if there is 10 pounds pressure by the gauge on a heating system, the real total pressure is 25 pounds. If 15 pounds of this is removed by mechanical means or otherwise, there are 10 pounds left, but instead of stating that the system is run under 10 pounds pressure absolute, it is customary to call it a vacuum system.

Assume that the steam pressure in the return pipes of such a system is below atmospheric pressure, and this reduction is made by means of a pump at the extreme end of the return pipes. Fig. 11 must be so located that the higher pressure or the inlet as indicated by the arrow will be at the outlet of the branch system, and the outlet of the reducing valve must be towards the vacuum pump. In other words, the branch system represents the boiler for a high pressure heating system, while the pipes leading to the vacuum pump represent the ordinary reduced pressure system.

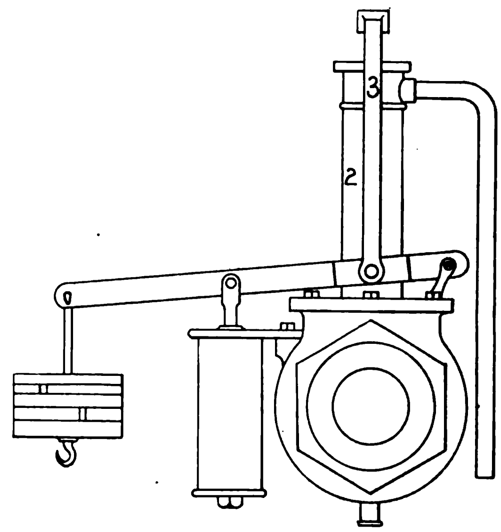


FIG 12

All reducing valves of this type must be located so that when not in use, the weights or the springs with which they are equipped will hold them open, therefore in this case the weights hold the valve downward to open instead of upward, as in the three preceding illustrations in this chapter. The consequence is that in order to close this valve, the reduced steam pressure must act upward on the diaphragm, and the construction of it shows that it does so operate. Pressure is regulated by weights on the lever in the usual way.

Fig. 12 is an end view of a piston-operated reducing valve, equipped with a lever on the end of which weights are placed to secure the desired pressure on the outlet or low pressure side. A dashpot is shown in the illustration, the object of which is to prevent violent vibration of the lever under sudden changes of pressure, as for illustration when one or more engines exhaust into a heating system that this valve controls. Where a steady pressure is maintained the dashpot is omitted.

Fig. 13 is a sectional view of the same valve, and taking these illustrations together they fully show its operation. The vertical cylinder 2 in Fig. 12 contains a nicely fitting

piston that is further illustrated in Fig. 13. It is connected by means of a stem or piston rod to the yoke 3, which is at-

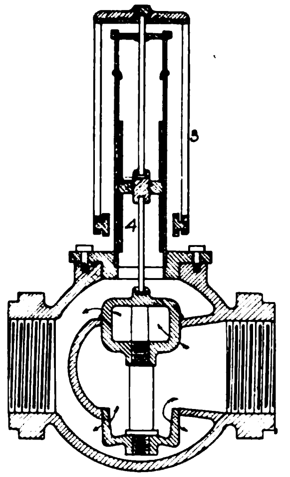


FIG 13

tached to the lever as shown, consequently the weights hold the piston 4 down, and as it is secured directly to the valve, they both operate together. When steam is admitted, it flows freely through until the desired pressure accumulates on the low pressure side. As the total pressure exerted slightly overbalances the force due to the outside weighted lever, the valve slowly closes and prevents the pressure from rising too high. A slight reduction of the heating pressure causes the valve to open again, and thus the pressure is maintained nearly constant.

The mechanism of this valve is simple and it is not liable to get out of order, but the piston needs lubrication, and if a poor grade of cylinder oil is used for this purpose it will leave sediment to burn on to the surfaces and prevent them from moving freely, hence pressure will rise too high and then fall too low, causing annoyance and trouble to the engineer in charge, and resulting in dissatisfaction to all who use the steam supplied. This is not a theory of what might possibly happen, but the result of careful observation of the practise of others along this line, which has made personal experience unnecessary.

If provision is made, when such a valve is installed, for feeding Dixon's Flake Graphite into the cylinder of it, the result will be satisfactory to all concerned.

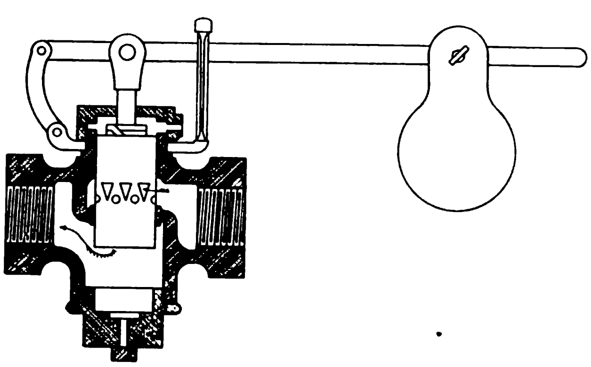


FIG. 14

Fig. 14 is a piston valve in which steam passes through small holes in the piston, then goes into the heating system. As this piston is perfectly balanced, it operates easily and maintains a steady reduced pressure regardless of reasonable variations in the boiler pressure, for as soon as enough accumulates under the piston to overcome the leverage of the pear-shaped weight, the supply is nearly shut off until there is a very slight reduction of pressure when it opens again, but this operation calls for such slight changes that the flow of steam is practically continuous.

(*To be continued.*)

TREATMENT OF ELEVATOR CABLES.

A correspondent in the *National Engineer* inquires if it is considered good practise to treat elevator cables with graphite and cylinder oil or should they be operated dry.

The *National Engineer* replies that if there is any one part of an elevator mechanism that requires more careful attention than do the others, it is the cable. The cable should be lubricated in order to preserve it. Not only is an elevator cable subjected to a tensile stress—that tending to pull it asunder—but it also has to endure the continual bending and straightening out again as it goes over the sheaves. During the bending and straightening action, friction takes place between the individual wires, and the strands of which the rope is made up, so that lubrication is necessary for two reasons: to reduce friction in the cable itself, and to preserve it from corrosion, which is ever ready to take place.

The *National Engineer* further mentions that they believe that the Otis Elevator Company favors a mixture of linseed oil and tar oil, although a mixture of cylinder oil, graphite and tallow also acts very well. As the Otis Elevator Company have been large purchasers of Dixon's Graphite Grease for elevator cables, it is fair to presume that where they desire most satisfactory results they make use of Dixon's Graphite Grease for the reason that Dixon's Graphite Grease is a true lubricant, and the flakes of graphite work into the cable lubricating the strands that go to make up the cable and thus preventing friction and corrosion.

The Dixon Company have a very interesting pamphlet on this subject and shall be glad to send it to all who are interested in the matter.

HOW TO PUT BRASS COGS IN A WHEEL.

By John F. Koenig.

(Prize Contest.)

First, cut and dovetail where the cog broke, about one-eighth or one-fourth inch deep, according to the thickness of rim of wheel; then bore two holes in the cut and cut threads in them; cut threads on rod and screw in tight. Then cut the rod off about one-fourth inch shorter than the height of cog. The rod must be so that the brass covers it. Now take two plates the height and width of the cog and shape the same as the other cog. Then set the plates on the edge of the cut to get the right thickness of cog. Now take two more plates, place them on the sides and clamp all together with clamp screws. Now fill the space between the plates and other cogs with clay to keep them in place. Then take a plumbago crucible and put in your old brass and melt it to a very bright heat, so that it flows very freely. Now pour in quickly and, after it cools, take away the plates and dress down edges with a file, and you will be delighted how nice a cog you have. I charge from $1.50 to $5.00 per cog, according to the size.

—*American Blacksmith.*

THE CATECHISM OF A SCIENTIST.

(As prepared by Sir Oliver J. Lodge, D. Sc., F. R. S., Principal of the University of Birmingham, England, and given out by him as a "partially scientific basis for future religious education.")

1. Q.—What are you? A.—A being, alive, conscious, upon this earth, my ancestors having ascended by gradual processes from the lower forms of animal life, and with struggle and suffering became man.

2. Q.—What, then, is meant by the fall of man. A.—At a certain stage of development man became conscious of the difference between right and wrong, so that thereafter when his actions fell below a normal standard of conduct he felt ashamed and sinful. Nevertheless, the possiblity of the fall marks a rise in the scale of existence, as creatures below this level are irresponsible, feel no shame, suffer no remorse, and are said to have no conscience.

3. Q.—What is the distinctive character of manhood? A.—That he has responsibility for his acts, having acquired the power of choosing between good and evil, with freedom to obey one motive rather than another.

4. Q.—What is the duty of man? A.—To assist his fellows, to develop his own higher self, to strive toward good in every way open to his powers, and generally to seek to know the laws of nature and obey the will of God, in whose service alone can be found that harmonious exercise of the faculties which is synonymous with perfect freedom.

5. Q.—What is meant by good and evil? A.—Good is that which promotes devolopment and is in harmony with the will of God. It is akin to health, beauty, and happiness. Evil is that which retards and frustrates development and injures some part of the universe, and is akin to disease, ugliness, and misery.

6. Q.—How does a man know good from evil? A.—His own nature, when uncorrupted, is sufficiently in tune with the universe to enable him to be well aware of what is pleasing and displeasing to the Guiding Spirit, of which he himself should be a real, effective portion.

7. Q.—How comes it that evil exists? A.—Acts and thoughts are evil when they are below the normal standard attained by humanity. The possibility of evil is a necessary consequence of the rise in the scale of moral existence, just as an organism whose normal temperature is far above absolute zero is necessarily liable to a damaging, deadly cold, but the cold is not itself a positive or created thing.

8. Q.—What is sin? A.—Sin is the deliberate, wilful act of a free agent who sees better but chooses worse, and thereby acts injuriously to himself and others. The root of sin is selfishness, whereby needless trouble and pain are inflicted on others. It is akin to moral suicide.

9. Q.—Are there beings lower in the scale of existence than man? A.—Multitudes. In every part of the earth where life is possible we find it developed. Life exists in every variety of animal, in the earth, in the air and the sea, and in every species of plants.

10. Q.—Are there beings higher in the scale of existence than man? A.—Man is the highest of the dwellers of the planet earth, but the earth is only one of many planets warmed by the sun. The sun is only one of a myriad of similar suns which are so distant that we hardly see them, and group indiscriminately as stars. We may be sure that in some of the innumerable worlds circulating about distant suns there must be beings far higher in the scale of existence than ourselves.

11. Q.—What caused and what maintains existence? A.—Of our own knowledge we are unable to realize the full meaning of its origination and maintenance. All we can accomplish in the physical world is to move things about by means of our bodily organisms and then leave them to act on each other. But we conceive that there must be some intelligence supreme over the whole process of evolution or else things could not be as organized and as beautiful as they are.

12. Q.—Is man helped in the struggle upwards? A.—Man did not bring himself into existence, nor can he unaided maintain his existence or achieve anything whatever. There is certainly a power in the universe vastly beyond our comprehension. We trust and believe it to be a good, loving power, able and willing to help us and all creatures, to guide us wisely without detriment to our incipient freedom. This loving kindness surrounds us every moment. In it we live and have our real being. It is the mainspring of love, joy and beauty. We call it the grace of God. It sustains and enriches the world. It may take a multiplicity of forms but its essence and higher meaning is especially revealed to the dwellers on the earth in the form of the divinely human perfect life of Jesus Christ, through whose spirit and living influence man may hope to rise to heights at present inaccessible.

13. Q.—How may we become informed of things too high for our own knowledge? A.—We should strive to learn from the great teachers, prophets, poets, and saints of the human race whose writings have been opened to us by education. Especially should we learn how to interpret and understand the Bible, which the nations hold in such high honor.

14. Q.—What, then, do you reverently believe can be deduced from a study of the records and traditions of the past in the light of the present? A.—I believe in one infinite eternal Being, a guiding, loving Father, in whom all things consist. I believe the divine nature is especially revealed to man in Jesus Christ, who lived, taught, and suffered in Palestine, 1,900 years ago, and has since been worshipped by the Christian Church as the immortal Son of God and Saviour of the World. I believe the Holy Spirit is ever ready to help us along the way to goodness and truth; that prayer is the means of the communion of man and God, and it is our privilege by faithful service to enter life eternal, the communion of saints, and the peace of God.

15. Q.—What do you mean by life eternal? A.—Whereas our terrestrial existence is temporary, real existence continues without ceasing in either higher or lower form, according to our use of the opportunities and means of grace, and that the fulness of life which is ultimately attainable represents a state of perfection at present inconceivable to us.

16. Q.—What is the significance of the communion of saints? A.—Higher and holier beings must possess in fuller fruition those privileges of communion which are already foreshadowed by our own faculties, language, sympathy and mutual aid, and just as we find our powerful friendship help not altogether limited to our own order of being, so I conceive the existence of a mighty fellowship of love service.

17. Q.—What do you understand by prayer? A.—That when our spirits are attuned to the spirit of righteousness, our hopes and aspirations exert an influence far beyond their conscious range and in the true sense bring us into communion with our Heavenly Father. This power of filial petition is called prayer. We are encouraged to ask for anything we need. As children we ask our parents in a spirit of trust and submission, and we may strengthen our faith in the efficacy of prayer by pleading the example and merits of the Lord Jesus and rehearse the prayer taught by Christ: "Our Father, who are in Heaven."

18. Q.—What is meant by the kingdom of Heaven? A.—The kingdom of Heaven is the most essential feature of christianity. It signifies the harmonious condition or state in which the divine will is perfectly obeyed. It represents the highest state of existence, individual and social, which we can conceive. Our whole efforts should directly and indirectly make ready its ways in our hearts and our lives and in the lives of others. It is the ideal state of society toward which reformers are striving. It is the ideal of conscious effort toward said aim.

A BUSINESS LANGUAGE.

Esperanto as a Medium of Trade Communications.

Consul H. L. Spahr, of Breslau, reports a movement in favor of making Esperanto a universal language. He writes:

All over the world trade associations, tourist clubs, scientific societies, and other organizations are seeking a universal language. Whenever an international congress is held, the need for such a language is recognized and discussed. An international committee is being formed, which is to select a universal auxiliary language subject to the following generally accepted limitations: It must be able to serve the needs of daily life, the demands of trade and commerce, and also the purpose of science. It must be easy for people of average education to learn. It should not be one of the living national languages. If the committee adopt a language it is almost certain to be Esperanto.

Esperanto is a language with few rules and no exceptions, no irregular verbs; with a pronunciation, accent, and spelling that can be learned in one lessen, and with a small vocabulary, many of whose words learners already know or guess; besides it is clear, flexible, and rather sonorous.

RECOMMENDED TO AMERICAN MANUFACTURERS.

American manufacturers and dealers should make use of this medium in their campaigns for trade with foreign countries. Chambers of commerce and trade organizations should give it a careful consideration. Exporters should study it and have their managers, clerks, and traveling salesmen study it. There are Esperanto groups in the 24 leading cities of Germany, and new ones are forming. There are in the world about 425 groups, besides 60 trade or scientific organizations, whose members either are all Esperantists, or use Esperanto when writing to a member in another country. Fourteen periodicals are printed wholly in Esperanto, 17 partly, and 19 well-known journals devote more or less space to Esperanto articles. In recent times eight international business or professional congresses have recommended or adopted Esperanto as the language to be used.

American exporters should not be behind, if Esperanto be selected; favorable action by them will hasten its adoption. Indifference may give their trade rivals an advantage. Our manufacturers may wake up some day to see English, French, and German salesmen running over the world, glibly talking Esperanto wherever they go, and taking large orders. This is no exaggeration, for Esperanto is being taught in many Japanese schools, and Peru publishes an Esperanto journal. In France and England the movement is especially strong. With Esperanto, in case a correspondent thinks the addressee will not be able to read his letter, he has only to put in a key in the addressee's language, or refer him to the nearest Esperanto group, which will translate for him free of charge. This key is published in many languages, and by its use the letter can soon be read. The key weighs only 5 grams (0.17 ounce.)—*U. S. Consular Report.*

PENCIL WRITING.

Increasing Use of Pencils in Writing Letters and for Similar Purposes.—Improvement in Quality.

Once discarded for letter writing and similar purposes, the lead pencil is coming into favor again; more abroad than here, perhaps, and while the change is coming about slowly, it is none the less surely. Formerly pencils were commonly used for this purpose, but the improvement in writing inks, the increased use of fountain pens and the growing number of typewriters, all combined to crowd the pencil into the background when considered for letter writing.

Possibly the question of quality had something to do with the neglect from which pencils suffered. Perhaps it was an unwise choice in the degree of hardness of the pencil selected. Perhaps all these factors had their influence. At any rate, for a long time it has not been considered good form to write letters with a pencil, and the trade suffered to that extent.

The change in sentiment which is gradually bringing about a different situation promises to cause a change which will redound to the benefit of the trade in all its branches. A letter written in pencil, if it is of the proper degree of hardness, looks as neat as one written in ink. Some might think that a pencil-written letter looks even better than one in ink, but that is a mere matter of taste.

In some instances, the pencil is such a desirable substitute for ink that even many of the inferior pencils supplied in the past for this purpose have been preferred to ink. Who, for example, has not been caught at a wayside hotel, where the pens and ink were execrable, through no fault of their makers, however, and had to resort to a pencil to make a legible mark? The probability is that most men have been caught in that way more than once and have blessed the inventor of pencils as vigorously as they have denounced the wretched writing instruments supplied by the hostelry.

Pencils of the right quality will surely be used more freely than they are now for writing purposes, and this use will undoubtedly increase as manufacturers improve the quality of their product designed for this special purpose. A smooth lead, which makes a fairly clear mark, and will not break readily, is what is desired. Manufacturers are meeting the demand to some extent, but there is opportunity for an increase in business in this particular direction considerably more important than has been appreciated. Apparently good pencil writing will again become common, as it once was.

—*American Stationer.*

LUBRICATION OF TRANSMISSION ROPE.

The following article was reproduced from *The Engineer*, (April 1, 1907), and gives an idea of how flake graphite preserves the life of cotton ropes.

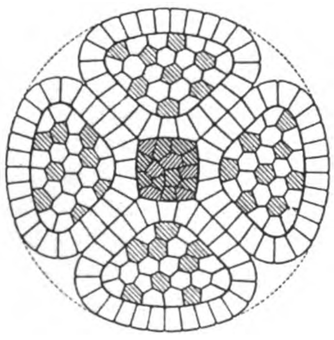
With the marked increase in number of rope drive installations throughout this country and Canada, the subject of rope lubrication comes more prominently before the engineering public as its influence on the durability and working of the "flying transmission of power" is becoming better understood.

Power transmissiòn fiber rope is practically all made of manila hemp, though raw hide, leather, hemp and flax rope drives are occasionally found. Of course, iron and steel wire ropes are extensively used for special purposes of transmission over very long distances, but they have no general application and form a class apart.

Cotton has special advantages for small drives between closely spaced shafts, as in distributing power to a large number of spindles or pickers, or where large sheaves are objectionable as in case of limited head room. It is softer and more pliant than manila, so that it will stand bending around small sheaves.

Cotton has a small amount of lubrication from the solidified, oily matter distributed on the internal surface of fiber and deposited during growth. It also contains a certain amount of moisture. Cotton rope is not lubricated internally, as its natural suppleness and smooth component surfaces prevent brittleness and destruction by internal abrasion. An external dressing is applied to prevent the rope's fraying and "fluffing" by the fiber rising, as well as to protect it from weather, and to retain the natural moisture.

For large transmissions, particularly to long distances, cotton rope is not to be compared with manila, because for equal diameters it has only 4-7 the strength of manila; because it is not at all impervious to moisture and the weather, and is subject to rot if kept wet for any length of time; it cannot be satisfactorily spliced; it stretches more than manila; it causes a greater loss of power in pulling the ungreased rope out of the grooves; and, finally, because for equal powers it is decidedly more expensive in first cost and in maintenance.



Transmission rope made from manila hemp is particularly subject to internal wear unless scientifically lubricated with the best kinds of material. Weight for weight, these ropes are as strong as steel in the direction of their length, but have little transverse strength owing to their cellular structure. When the stems are subdivided by machinery, the fibers are made peculiarly rough and splintery. When these rough surfaces are bent around a sheave, they slide on each other with much force, every part of the rope section rubbing upon its surrounding fibers. This may happen many times in a minute according to the distance between shafts, which is absolutely destructive to the rope life, the fiber being wholly ground to powder.

Apart from the abrasion by internal friction, there is a destructive action by constant flexure of the fibers of the cell ends just as a wire is broken by frequent bending at one point. If the strands of a worn out rope are untwisted, a quantity of fine powder will be found in the inter-spaces between the yarns, produced from the total destruction of the fibers by their internal movements with respect to each other. No rope can long endure this destructive abrasion without lubrication. The degree of skill with which the lubricant is applied and its character, determine to a great extent the rope's durability. Well lubricated rope outlasts at least four lengths of the same diameter rope laid up dry.

External dressings do not soak into the places where the real friction takes place, so that their effect is merely local, leaving the interior dry. Soaking the strands in tallow before laying up gives imperfect protection, as tallow has not "body" enough to cling to the fibers. It works out or dries out. The free fatty acid contained in tallow attacks the fibers and if it becomes rancid it causes the rope to rot.

"American" transmission rope is lubricated by thoroughly soaking the core as well as a number of inner yarns of each strand in a bath, composed mainly of the finest flake graphite obtainable, mixed with fish oils of a neutral character. The accompanying cut shows a cross section of a four-strand "American" rope, the shaded portions indicating the graphite lubricated core, or heart, and yarns of each strand. Special machinery has been worked out for applying this bath to the parts without interfering with the process of twisting and laying up.

Flake graphite is precisely the same material which has established its reputation among engineers for the lubrication of engine cylinders and bearings. The lubricating compound here used permeates all the fibers of the completed rope, lodging in the hollows, smoothing out the uneven places and forming layers of unguent between all fiber and yarn surfaces. This constitutes perfect lubrication. After a short period of service, enough of this mixture is soaked into the external fibers to form by action of the running sheaves, a glossy black metallic coating on the outside of the rope, which is absolutely impervious to water. Ropes thus lubricated require no dressing or any attention as to maintenance. If not absolutely abused, they will last 10 years and even longer.

Those who are interested in the subject of rope drive would do well to write to the Joseph Dixon Crucible Co. for a copy of their new booklet "Wire Rope Lubrication," which, besides dealing with the subject of wire rope lubrication, contains much valuable information on the selection and care of wire ropes.

NOT ALWAYS A LIAR.

"Little boy," said the good woman, "do you always tell the truth?" "No'm." "Don't you know it's very, very naughty to lie?" "Yes'm." "Then why do you do it?" "I don't. Sometimes I'm too busy to talk."

—*Philadelphia Ledger.*

THE HORSE DOCKING FAD.

Coachmen Blame Society Women.

Artist Davenport has been making a strange fight against the many abuses of the horse—especially in the matter of docking and of cruel checks and bits. Davenport's pictures on the subject, as well as his writings have commanded much attention.

At a meeting of coachmen held in New York City the coachmen were loud in their denunciation of cruelty to horses. They blamed the women for the curb bits, high check reins and docked tails.

"The coachmen, almost without exception," said one of them to an *Evening Mail* reporter, "are strongly opposed to the high check, curb and burr bit, and the barbarous practise of docking. I know of men who would as soon cut off their right hands as dock a horse. The society women are in a great measure responsible for the cruelty to horses. They want stylish rigs, and to them style means a horse with his head jerked up in the air by a check rein, a huge, torturous bit and a bobbed tail.

"To sensible people this is barbarity, not style. But the women and men in high society can't see it that way. We hate to drive horses that are fitted with such appliances, but what are we to do?

"Our employers insist that their horses be treated in this way. We have families to support and we must live. If we refused to comply with the demands of our employers, we would lose our positions, and our families would go without food.

"The only thing we can do is to comply with the demands of those who furnish us our daily bread, cruel and barbarous as these demands often are. We can temper this cruelty as much as possible by treating the horse as well as we can under the circumstances, but when our masters or mistresses say, 'Tighten that check,' or 'Take that horse and have him docked,' it is up to us to do it, or get dismissed."

The coachmen said that they did not think the women who liked stylish rigs were really cruel at heart, but that they did not understand to what keen suffering they were putting their faithful animals.

It was ananimously decided that if the horses of the wealthy are to be freed from the cruelties of bits, check and docking it could be accomplished only by teaching the society people themselves what a cruel thing they were doing in perpetrating these practises.

NO WONDER.

Recently a Washingtonian in conversation with "Ollie" James, the gigantic and genial Congressman from Kentucky, made certain inquiries with reference to a mutual friend whom he had not seen for a number of years—a Colonel P., of the State mentioned.

"And how does my old friend, the Colonel, spend his declining years?" asked the Washingtonian.

"Beautifully, sir, beautifully," answered James. "He has a fine farm, sir. And a string of trotters, sir. And a barrel of whiskey sixteen years old, and a wife of the same age, sir."—*May Lippincott's.*

"I know not what the truth may be;
I'll tell it as 'twas told to me."

WHERE WAS AGOSTINO?

The following story going the rounds of the press should be of interest to the American woman as proving what sarcastic things they say occasionally of women on the other side:

Prof. Matteucci, superintendent of the Vesuvius Observatory, was dining with some Americans at the Hotel Royal in Naples. The dining room fronted the sea. The waves crashed against the massive embankment of stone, and showers of white spray rose high in the sunlit air.

"This is heavenly. But what is it like in your observatory when Vesuvius is active?" a young women asked.

"It is not like Heaven," said Prof. Matteucci. "It reminds me of a story about a Neopolitan widow whose husband had been dead some years. One night she was persuaded to go to a spiritualist's seance and there the spirit of her dead husband appeared and spoke to her.

" 'My dear Agostino', said the widow to the shade, are you happy now?'

" ' I am very happy,' Agostino replied.

" 'Happier than you were when on earth with me?' asked the widow.

" 'Yes,' replied the shade; 'I am far, far happier now than I was on earth with you.'

" 'Tell me, Agostino; what is it like in Heaven?

" 'Heaven?' said Agostino. 'I am not in Heaven.' "

—*Chicago Evening Post.*

THE MAN WHO WINS.

The man who wins is the man who works—
The man who toils while the next man shirks;
The man who stands in his deep distress
With his head held high in the deadly press—
Yes, he is the man who wins.

The man who wins is the man who knows
The value of pain and the worth of woes—
Who a lesson learns from a man who fails
And a moral finds in his mournful wails;
Yes, he is the man who wins.

The man who wins is the man who stays
In the unsought paths and the rocky ways,
And, perhaps, who lingers, now and then,
To help some failure to rise again,
Ah, he is the man who wins!

And the man who wins is the man who hears
The curse of the envious in his ears,
But who goes his way with his head held high
And passes the wrecks of the failures by—
For he is the man who wins.

—*Baltimore News.*

A FLITTING.

A fly and a flea in a flue
Were imprisoned, so what could they do?
Said the fly: "Let us flee."
Said the flea: "Let us fly."
So they flew through a flaw in the flue.

—*Life* (Melbourne, Autralia.)

SCHWAB'S APPRENTICE OFFER.

3,000 Apprentice Boys Coming From Nearly Everywhere.

Charles M. Schwab's offer to 3,000 boys to come to his Bethlehem Steel Works prepared to learn and become experts in the steel and iron trade in all its details has been accepted by more than 200 boys to date. These range in age from 16 to 21. Fifty-two per cent. of the new apprentices are of German descent, 25 per cent. are of Irish descent, and 20 per cent. are strictly "Americans." Three per cent. of the boys are Polish.

Many of the newcomers are high school graduates or hail from manual training schools. Nearly all the boys show such an aptitude for handling machinery as to astonish the heads of departments to which they have been assigned. Not more than 5 per cent. of the total number of those who applied failed in their tasks and decided to quit.

A majority of those who responded came from the Lehigh Valley. In that district there are thousands of skilled iron workers. In the Schwab offering they saw a chance for their sons to learn the business and become more than mere mechanics. This accounts for the rush. Others came from Virginia, Ohio, Michigan and even from Florida. It is regarded as remarkable that none of the boys came from Pittsburg, but the belief is that every boy in that quarter is pretty busy in the steel mills.—*American Industries.*

ENCRUSTATION OF AUTO CYLINDERS.

Power Wagon says:

"Sooner or later an engine becomes foul through the formation of a hard carbon deposit upon the top of the piston and upon the surface of the combustion chamber. Some engines are much more sensitive to this deposit than others and, speaking generally, it may be said the higher the compression the sooner it becomes necessary to remove the deposit. This is by no means an easy job. In the majority of cases it means drawing the pistons or taking the cylinders off. At the same time, when the deposit attains a certain thickness something must be done, as the compression gets so high that premature firing is occasioned, and not only so, some portions of the deposit itself become so heated that the engine may go on firing more or less irregularly after the current is switched off. The long and short of it is, with a very few exceptions, the removal of the deposit means the pulling down of half the engine, and it is, therefore, a procedure which is well worth avoiding if possible. The deposit can be stopped by the use of plumbago, coating the top of the engine piston and the combustion chamber (after thoroughly cleaning them) with ordinary plumbago mixed into a paste with gasoline." This is all right so far as it goes, but as "ordinary plumbago" contains many sorts of impurities we suggest that Dixon's Motor Graphite be used instead. It will be found far superior. It is a perfect lubricant; will fill the pores of the metal; is not affected by the heat and improves the compression.

PARTING WITH AN OLD STOVE.

A far greater portion of the people among whom we live are sentimental than many identified with business affairs are willing to admit. A letter received from A. C. Mott, president of the Abram Cox Stove Company, incloses a copy of blank verse received from one of its old customers, James Fryer, of Chester, Pa., on the parting with an old stove. The stove in question bore the name of Dawn and was put on the market by the old concern of Cox, Whiteman & Cox in the early sixties. The stove was among the first changes from the sheet iron air tight stove, having a round pot lined with fire clay. It was an example of the excellent taste shown in the productions of the early artists in stove design. With its cast iron base and top, with the Russia iron body and fire clay linings, it was not only a formidable heater but presented a dignified appearance in keeping with the surroundings of even handsomely furnished apartments. It was of a style still favored in preference to the glittering nickel plated illuminating stoves that now are classed among popular favorites. The old stove having at last succumbed to the ravages of time, elicited the following from the owner who had so long enjoyed its service:

"The Old Iron Stove."

BY D. M. JOHNSON, CHESTER, PA.

I hate to part with you, old stove,
You've warmed me these forty years,
And stayed by me more than half my life.
Bright days and dark days, sad days and glad days,
Autumn's chill and winter's cold
Have found you always in your place.
Though we have passed some dreary days by your side
We have also had jolly times around your genial glow,
And you held your peace and were true.
What a good friend is he who stands by you always,
Keeps your counsel and is never false to your trust.
Whenever I fed you, old stove, on coal or chips or old newspapers,
You digested them all, and glowed with a cheerful warmth.
When the smoke pipe sulked you told me,
And when I cleaned out the soot, how you rejoiced
And breathed freer and lighted up the room
With the joy of being able to serve me as before.
Royally you did your work for forty years,
But now your day is done, and you must go or be turned into scrap or old iron.
But, old stove, you will not go to the scrap heap alone,
For it is certain that I will shortly follow.
Another forty years, aye, less, and I also will be gone.
Old stove, you were faithful to the end.
Would I could always be as true as you—
Never weary, never indolent, never careless, never impatient of my work.
Good-bye, old stove, I do not know who will get you, how he will use you;
But he and you will never be better friends than you and I.
I would not of my own accord let you go,
For I can never forget the good work you have done;
But duty calls, and you will heed,
For you have never complained or shirked a duty,
And you will go into scrap iron or be melted in a seething mass
As cheerfully as you went into a stove.
May I be as ready to meet the inevitable change
That will shortly come to us all.

—*Metal Worker, Plumber and Steam Fitter.*

THE EARNEST MAN.

The man who has genuine earnestness all through life is bound to get somewhere ultimately—to do some thing that is worth while. He may, and undoubtedly will make mistakes like the rest of creation, but he goes at everything with a set purpose. If he finds himself on the wrong track, if one policy or course fails, proves weak, untrue or unfeasible he doesn't swerve, lounge in idleness, give way to gloom, dispair or dissipation. He just buckles his belt a notch tighter and goes at it again on another tack.

The earnest man, nine times in ten, has it in him to labor tirelessly in the accomplishment of a desired purpose, and, moreover, he will have that purpose fixed and outlined before him. He takes pride and pleasure in his work. He wants to do something that counts. He is never a blowhard or a braggart. He is intent on results, and what others say or what goes on around him bothers him not at all. Earnestness and intelligence give birth to great achievement and surmount difficulty with ease. The earnest man seldom wastes his time. He knows that that is man's best possession and he is ever reluctant to put off till tomorrow what may be done today that he may indulge in amusements. I would rather be surrounded by earnest men, who cannot be dishonest or careless, than by a horde of others claiming the hall mark of genius and carrying its irresponsibilities.—*N. Y. Com.*

PARADOXES OF TRAVEL.

There are many surprises to him who travels. There are no onions in Bermuda for the visitor. They are all exported. No tobacco grows in Egypt. The khedive has forbidden its cultivation. There are no olivetrees on the Mount of Olives. The Turks and tourists have destroyed them. The French do not eat frogs. The Parisian restaurants may be searched for days without finding a single frog. Irish whisky is drunk in Scotland and Scotch whisky in Dublin.

The Holland cheese is seldom seen in The Hague, and Neufchatel cheese is made in New York. Kansas City is in Missouri. The chief justice of the Supreme Court of Egypt is a citizen of the state of Florida, and the head of the anti-Armenian party in the Turkish empire is an Armenian.

—*Exchange.*

Under "Questions Likely to be Asked, for Promotion, Together With Their Answers", on page 474 of *Locomotive Firemen and Engineer's Magazine* for April, will be found the following:—

"Q. How would you proceed in case of a hot bearing?

"A. If for any cause a bearing becomes hot while on the road, the first thing to do is to see that the oil hole is open. Then make sure that the bearing receives plenty of lubrication, use valve oil, soap or graphite, or a mixture of these lubricants. Proper lubrication is the best treatment for a hot bearing and water should not be used if the bearing is very hot."

We have had thousands of testimonials from engineers, saying that if it hadn't been for Dixon's Ticonderoga Flake Graphite they would have had to shut down to let the bearings cool.

THE DIXON LIBRARY

The above group shows some of the newest and finest Dixon books. These eight quite thoroughly cover the Dixon line. You may make two selections from the list and the books will be promptly sent free of charge.

Dixon's Graphite Productions

This is the complete catalog. It includes all the products manufactured by the Dixon Company and gives descriptions of these. This is the latest ('07) edition, fully up-to-date, and profusely illustrated.

Through 'Frisco's Furnace

A handsome brochure containing illustrations from photographs of notable San Francisco buildings and showing the effects of earthquake and fire upon them. Some valuable data on Dixon's Silica-Graphite Paint as a preservative of steel work.

Graphite as a Lubricant

An exhaustive treatment of the subject of graphite lubrication as applied to almost every line of work. All having to do with machinery will find this volume invaluable to them. This work is in its Tenth Edition.

Air Compressor Lubrication

The dangers in the present system of lubrication in air compressors and the proper method of minimizing these dangers, or doing away with them entirely, is explained in detail. In typographical arrangement this booklet is attractive and legible.

A Study in Graphite

To the enquiring mind that wants scientific facts, this book will make special appeal. Here are given the results of a long series of tests with data and conclusions drawn from them by Prof. Goss of Purdue University. Illustrations of the testing machine and bearings are shown.

Crucibles: Their Care and Use

Mr. John A. Walker, vice-president and general manager of the Joseph Dixon Crucible Company, is the author of this work, and his 40 years' connection with the company makes it authoritative. The use and abuse of crucibles is the theme. A valuable addition to any technical library.

Dixon's Guide for Pencil Users

This is a complete guide that every one who uses pencils should have. It tells exactly what pencils are best suited to your needs. The guide is indexed by vocations, and thus enables you to readily find the precise pencil you will wish to use.

The Horse

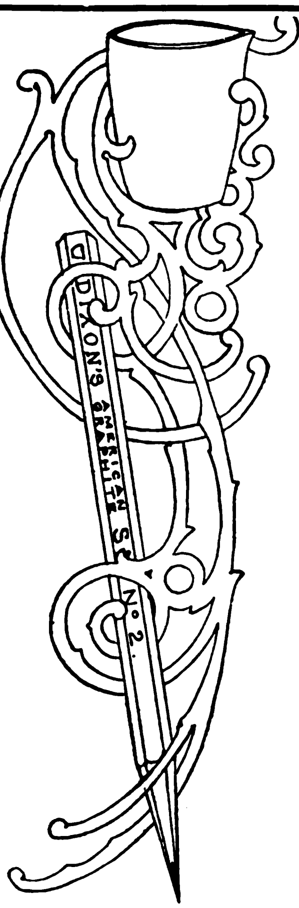
Most of us are interested in horses, and some of us are fortunate enough to own one. "The Horse" is a collection of useful information gathered from numerous authorities, and concerns the care of the horse in and out of the stable.

JOSEPH DIXON CRUCIBLE CO., Main Office and Works, JERSEY CITY, N. J.

Graphite

VOL. XI. JULY, 1907. No. 7.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



JOHN A. WALKER.

John A. Walker died at his residence in this city on Thursday night after a brief illness. He was born in New York on Sept. 22, 1837, and had been a resident of this city since 1869.

Mr. Walker touched the business and social life of this city at so many points that his death carries grief to all sections. He was diligent in business, and as vice president of the Dixon Crucible Works and practical manager he was loved and respected by his business associates and a large number of employees. Before he became the actual head of the business, seventeen years ago, it had been wrecked by bad management, but through Mr. Walker's business sagacity and Mr. E. F. C. Young's financial ability the works have been many times enlarged, and it is now a world institution of immense value.

Mr. Walker was vice president of the Colonial Life Insurance Company, now one of the most successful companies of the country, and he was a director in the Title Guarantee and Trust Company, another flourishing institution. These business connections kept him very fully occupied; but like most busy men, he had time for social life, and was connected with the Cosmos, Union League, Carteret and Twilight Clubs, and always was a welcome visitor at the club houses. He was also a member of the Lincoln Association and the Board of Trade. He was an officer of the Children's Home and a member of the First Presbyterian Church. He was a Republican in politics and twice accepted appointments to office. Once, as a favor to Mayor Collins, twenty odd years ago, he served two years in the Board of Education; and once, as a favor to Mayor Fagan, he served three years in the Board of Library Trustees. He did not want public office, though his popularity was such that he might have secured any office in the gift of his fellow-citizens.

Mr. Walker was of a rather modest disposition, but was always ready to help along any movement for the general good. He was a remarkably well-read man, and had supplemented his reading by extensive travel. He was a genial companion and a charming conversationalist, always kind and considerate, a patriotic American and a loving husband. His death is a personal loss to thousands of our citizens.

—*The Evening Journal, Jersey City.*

DIXON ANTICIPATES STANDARD HORSE POWER FORMULA.

At the last meeting of the Mechanical Branch of the A. L. A. M., held at Hartford, Conn., May 9, 1907, the formula adopted for the horse power rating of auto engines was $\frac{D^2N}{2.5}$, where D = diameter of piston in inches and N = number of cylinders. On page 11 of our booklet "Dixon's Motor Graphite, a Good Thing," printed January, 1907, the same formula appears. This serves to indicate the valuable and reliable character of the Dixon literature. It will always be found up-to-date and oftentimes, as in this case, anticipating later development.

CARRYING A PENCIL.

It is likely that every man in the world who is not a heathen or savage possesses a pencil, or borrows one on occasion. My old friend, Chimney Potts—poet of Troy, Homer of the Mohawk—says: "You can push a pen, but a pencil must be lead." The sage advice of Johann Quintenhammer—forty yeahs enn dais piznis!—is to carry your pencil always with the point down. But no one takes the advice. We all have too much respect for our pockets. A pencil is worth two cents; a pocket twenty cents. You can borrow a pencil but not a pocket. A well-sharpened pencil will make a hole in a pocket in an hour. Away go pencil and pocket. If the pencil has a cap, it is a pointed cap. Let us reform this pencil business.—*N. Y. Press.*

"I AM VERY fond of GRAPHITE, issued by the Joseph Dixon Crucible Company, and edited by Mr. Long, secretary of the Company. The amount of information that GRAPHITE has developed regarding graphites is remarkable. People write to Mr. Long telling him about new ways of using graphite. The people who write for the paper discover a lot of new things about it in their researches. It is a sparkling little sheet, and shows that Mr. Long is personally interested in it."—*American Industries—Adv. Bureau.*

WE ARE TOLD that it is estimated by the head of one of the large tobacco establishments of New York that at least $5,000 worth of tobacco it daily thrown away in the city in unconsumed cigars and cigarettes.

IT IS SAID that there has been a daily average of 108 persons settling in New York city during the last century.

HEALTHFUL CONDITIONS IN FACTORIES.

The Massachusetts State Board of Health has just reported the results of its investigation of conditions affecting the health of employees in factories. Attention was paid chiefly to those in which one or more of the essential processes involve exposure of the employees to possible unhygienic influences inherent to the industry.

It is shown that the indoor occupations of chief sanitary interest are those which involve exposure to irritating and poisonous dusts: exposure to irritating, poisonous, and offensive gases and fumes; contact with poisonous substances; extremes of heat and excessive dampness.

Of the several classes of dust,—those of vegetable, animal, metallic and mineral origin,—it is difficult to determine which is the most irritating to the respiratory tract; but the vegetable dusts are commonly so regarded in spite of the well-known fact that the occupations in which the employees inhale minute particles of steel, glass, and stone are remarkakle for their high death rates from tuberculosis of the lungs. But not all the dusts of one class are equally irritating; flax and cotton, for example, are more irritating than wood; steel is more irritating than brass; horn is more irritating than bone; granite is more irritating than marble, and glass far more than granite.

Workers exposed to dusty atmospheres are especially prone to disease of the lungs, especially pulmonary tuberculosis, the constant irritation bringing about a condition of the mucous surface which more readily admits of invasion by the specific germs. Those who are exposed to poisonous dusts are, unless proper precautions are observed, likely to fall victims of chronic poisoning. The most dangerous of the metallic dusts met with in this investigation are those of lead and its compounds.

There is no reason why these conditions should persist, for this investigation very clearly shows that they can be overcome if mechanical means are adopted. In the form of the fan blower or exhauster such means are constantly referred to throughout the report as being successfully applied for the purpose. The entire report is wonderfully suggestive of the progress which is being made in thus improving the hygienic conditions in manufacturing establishments.

SOAP AS A SUBSTITUTE FOR GREASE.

On page 12 of the May, 1907, issue of *Motor Print* appears an article, "Soap as a Substitute for Grease," in which the statement is made: "On chains and other loosely fitted parts, soap works fully as well as the best lubricant on the market."

Soap has a very high melting point and will only melt in a bath heated by steam or at a temperature equally high. To be useful as a lubricant, it is necessary that it first be reduced to a pasty condition and to bring it to this condition, heat, resulting from friction, must be generated. Grease, on the other hand, is already in this pasty condition and at once performs its function.

The limit for lubricants is between heavy soap and the lightest mineral oils.

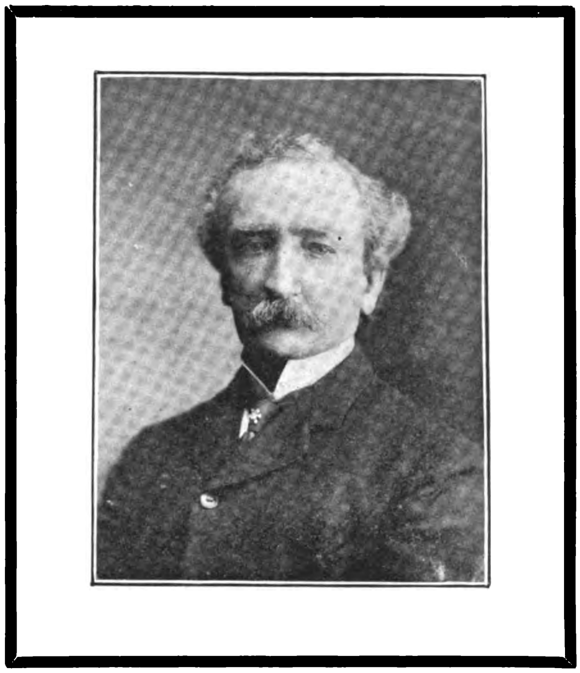
If soap is used alone there is danger of it flying upon the varnished parts and the alkali (all good soaps contain free alkali), will ruin the protective coat. However, when mixed with a small percentage of light mineral oil, this will not happen, as the free alkali will have combined with the oil.

A good chain lubricant should be one that will penetrate to all parts and at the same time form on the outside of the pins a film which will prevent dirt and grit from working into the bearings.

INNER TUBES OF AUTOMOBILE TIRES.

Motor Print says:

"Do not put too much French chalk in the outer cover for fear that it may lump and damage the inner tube. This is sure to happen if by any means moisture finds its way to the chalk. Graphite is a very efficient substitute for the chalk when the latter is not at hand." Except for the fact that graphite is black and therefore blackens the hands, it is far superior in every way to French chalk or talcum.



JOHN A. WALKER.

John A. Walker, Vice President and Treasurer of the Joseph Dixon Crucible Company, died at his home, Jersey City, N. J., on May 23. Mr. Walker was born in the city of New York, September 22, 1837. He received his early education in the schools of Brooklyn, and, although prepared for college in a private school, chose commercial life. After an excellent business training in the city of New York, and after serving his country in the civil war of the South, Mr. Walker in 1867 became connected with the firm of Joseph Dixon & Company, of Jersey City. In 1868, when Joseph Dixon & Company became incorporated as the Joseph Dixon Crucible Company he was made Secretary of that Company and began his lifework in making known to the world the many uses of the then but little known form of carbon, graphite, of which the Joseph Dixon Crucible Company have been the best and most widely known exponents.

Mr. Walker served the Dixon Company as Secretary and largely as Manager until 1891, when he was unanimously elected to the dual position of Vice President and Treasurer; the latter office having been held by him for some time previous. He held these offices without interruption until his death, the general management of the company also being largely in his hands. In stature Mr. Walker was somewhat below the average, but, born of sturdy Scotch parents, he was a good type of the nervous, driving, untiring, persistent Scotchman, and he possessed a large, finely-shaped head. In intellect he was keen, clear, critical, intuitive. In business he was thoughtful, cautious in looking ahead and preparing for emergencies. He had what is known as a wiry organization. His moral brain made him a just man. He was of the staunch Presbyterian school. What he believed to be right he did—no matter what others might do or say. Yet he was not contrary, nor set in his ways, nor unreasonable. While his sympathies were keen and easily aroused and his hand ready to open, yet no one found him wasting anything.

He was shrewd, energetic, liberal-minded and greatly enjoyed a good joke and plenty of fun in its place. Nothing escaped his eye. He had decided literary tastes and could put them to the test any day, either for business purposes or for an ethical cause.

Untiring and persistent devotion to business, however, with increasing age and lack of needed rest and recreation, began to tell on his vigor and strength, and on April 24 he went home for what he and his intimates supposed would be a few days' rest. Complications set in and a month later he was at rest forever.

As Vice President and Treasurer of the Joseph Dixon Crucible Company there was more than work enough for any ordinary man, yet, outside of his duties as such we find him Vice President Colonial Life Insurance Company, Director New Jersey Title Guarantee and Trust Company; Director Pavonia Trust Company; Director the Provident Institution for Savings; President the Children's Friend Society, all of Jersey City; Trustee the Stationers Board of Trade of New York. He had served as First Vice President of the National Stationers' and Manufacturers' Association. He was member of the Chamber of Commerce of New York and of the Board of Trade of Jersey City. He was Chairman of the Executive Committee of the Cosmos Club of Jersey City, member of the Carteret Club, the Union League Club, the Lincoln Association, all of Jersey City, member of the National Geographic Society, and associate member of the American Institute of Mining Engineers, and of the Society for Psychical Research.

In the years gone by Mr. Walker has actively and successfully served as member of the Jersey City Board of Education; as Trustee of the Jersey City Public Library and of other city institutions.

Whether as public official or officer of any institution, or member of any club, Mr. Walker has always been prominent and active and ready to take upon himself any duty or work and has always been successful in anything that he has undertaken.

Better than all, he has won the love and affection of thousands of men, women and children, and notices of his death brought messages of sympathy from business friends and others from all parts of the United States and from many foreign cities.

Mr. Walker leaves a widow only.

PRESSURE REDUCING VALVES.

By W. H. Wakeman.

Chapter III.

Fig. 15 illustrates a valve for reducing the pressure of steam, air, or water, and as there is no weighted lever to regulate the reduced pressure it can be located in a horizontal or a vertical pipe at pleasure, also at any desired angle for a special purpose or condition, because the single coiled spring used works as well in one position as in any other that could be devised.

Steam travels through it in the direction indicated by the arrows, and when the reduced pressure rises to the desired point and has passed through the small pipe shown to the space above the diaphragm, some of it condenses and protects the rubber from the high temperature of steam. Acting on this large surface it compresses the spring and partially closes the balanced valve, thus preventing increase of pressure. It will be noted that the spring used is outside of the steam or water space, therefore its temperature is comparatively low even when used to control steam pressure. A peculiarity of this valve is that female threads are provided for the inlet, and male threads for the outlet.

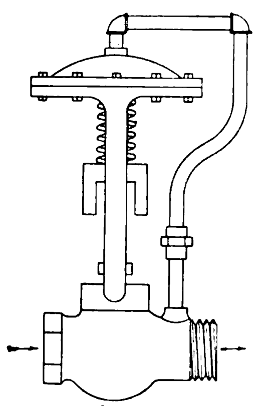


Fig 15

As many managers of steam plants do not seem to understand the value of reducing valves for various purposes, a few statements along this line will prove valuable. One very good general rule for application to steam engineering practise is never to use a higher pressure than conditions warrant. There are many plants where steam at high pressure must be used in some departments, while in others a much lower pressure will answer every purpose. The only solution of such a problem is to generate steam at high pressure and reduce it as required. In some places the old-fashioned way of simply opening a globe valve and letting steam rush out rapidly is still favored, but it is too crude, wasteful and unsatisfactory to be continued in modern practise, as the amount discharged bears no relation to the quantity required except as the engineer guesses from time to time. If this steam is used for heating purposes there is not always enough to fill the pipes, hence a part of the system is cold when it is most needed. On the other hand, when the temperature of the outside air rises and less steam is condensed, as a natural consequence the pipes are filled and more heat is then supplied than the conditions require.

Even where reducing valves are used the same pressure may not be required in all departments. For illustration of this condition, the writer's plant is mentioned where steam at four pounds pressure is conveyed to a large building through a twelve inch pipe. This answers the purpose perfectly under ordinary conditions, but would be almost useless in another department of the same building where twenty pounds is much more suitable. This requires two reducing valves, as seventy pounds pressure is carried on the boilers. In another department full boiler pressure can be used to advantage, hence there is no reducing valve on this line.

Concerning the reduction of air pressure, there are many places where it may be advisable and economical to compress air to a high pressure and afterwards reduce it for various uses, especially where it must be conveyed long distances, as it is not always practicable to locate air compressors near the place where rock drills and other machinery actually use the air under pressure.

It may be convenient and advisable to reduce water pressure just before the water is used, for if there is a high pressure on a street main it may cause trouble at various times when it is used. In my practise there is such high pressure that automatic water valves will not close against it, unless the balanced kind is used, hence a water pressure reducing valve is located on one line, and full pressure is utilized on others, and this plan proves satisfactory.

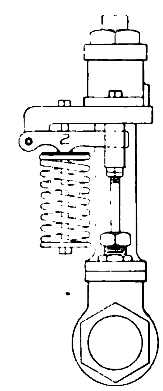


Fig 16

Fig. 16 illustrates another reducing valve fitted with one outside spring, but it does not operate directly on the valve stem, as a lever 2 is provided, one arm of which is longer than the other, consequently the spring moves only about one-third of the distance that the valve stem travels. As this keeps the spring at very nearly the same tension at all times, good results are secured on this account. This valve can be placed in any desired position without interfering with its successful operation.

Fig. 17 illustrates a steam pressure reducing valve to be used where the lower pressure does not exceed fifteen pounds to the square inch. An ingenious device is used to compensate for the increased tension on a coiled spring, when the coils are forced closer to each other. The valve is now in one of its higher positions, consequently the diaphragm must be forced downward when it is time to close the valve. The effect of this is to force the toggle links 2 and 3 (which now stand at an angle), nearer to a horizontal position. This action moves the upper ends of the curved levers 4 and 5 outward, bringing the lower ends inward against the action of the spring, which is adjusted for different pressures by the screw 6. When the toggle links 2 and 3 are in their highest position they are easily

held there by the spring, as the leverage is against them. This is proper because the spring is in an extended position, hence is easily compressed, but when the links 2 and 3

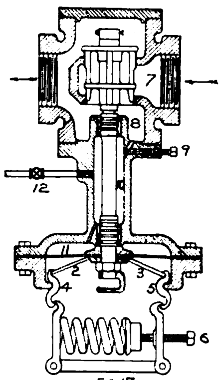


FIG 17

are nearly in a straight line it requires much force to hold them, as they exert a great leverage in that position. This is met by the spring, which is now compressed until the coils nearly touch, thus making it very stiff when stiffness is most needed. Thus the action of one offsets the other and the machine is equally sensitive at all points in its operation.

The extreme movement of the center of the diaphragm on a twelve inch circle, from the position shown in Fig. 17, is 5/32 inch in either direction, which does not strain the material beyond its elastic limit. These diaphragms are made either of very thin saw steel, or of phosphor bronze plates. Where three plates are used it makes a very flexible diaphragm. The lower plates are perforated or slotted to allow water or steam that may leak past the first one from bulging the others, as pressure acting on one or two of them would cause trouble along this line.

This valve is operated in either of the following ways. Steam entering at 7 passes the valve and enters the chamber 8, in the lower part of which there is a diagonal port which can be closed by a screw 9. Passing through this port it enters the chamber 10 and from thence goes through another port into 11, where the water resulting from condensation acts on the diaphragm. As this is made of metal, the temperature of steam will not readily injure it, but it is better to

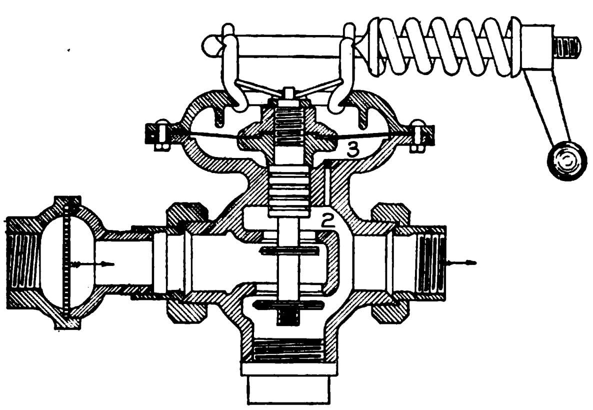


FIG. 18

have water collect at this point. When the pressure is secured for which the coiled spring is set by means of the screw 6, the diaphragm is forced downward and the valve is nearly closed until the flow of steam is checked, preventing excessive pressure.

When the valve is operated in this way the small pipe and valve are not used, but if this method is not satisfactory, the port under 8 may be temporarily closed by the screw 9, or permanently closed by giving the lower part of the valve one-quarter turn, when the small pipe 12 is connected into the main supply pipe on the low pressure side, thus supplying pressure in 10 and 11 to operate the diaphragm and the valve. The small pipe can be connected into the larger one near the main valve, as it is not necessary to carry it about 15 feet in accordance with instructions for cases where a rubber diaphragm is used. It is well to remember that when the pipe 12 stands parallel to the main pipe, the port under 8 is open when the screw is turned outward, therefore when 12 stands at right angles to its present position the port is closed, and the valve must be operated by the small pipe connected into the low-pressure system.

Fig. 18 illustrates a valve with a similar arrangement of toggle links, levers, springs, etc., but they are located above the valve instead of below it. Steam entering through the high-pressure piping passes through a screen as shown by the arrow, and going through the valve enters the port at 2 and from thence finds its way into the chamber 3, where it operates on the diaphragm in opposition to the action of the spring, as previously explained in connection with another valve.

Fig. 18 is especially designed for reducing steam pressure in car-heating service, although it can be used for any other similar service.

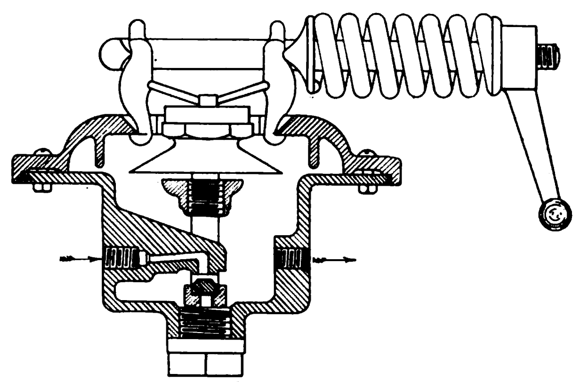


FIG 19

Concerning the worth of the screen shown in the enlarged union, I would say that it is of great value wherever steam is to go through a valve of any kind that is often very nearly closed, as it prevents foreign matter from reaching the nicely fitted parts of the valve, for although some of it will go through without doing harm, a portion will be caught between two surfaces and one or both will be spoiled. In all such cases if the valve was disabled so that it could not be used, repairs would be made and that would end the matter, but as it will still do a part of the work for which it was installed, it is usually allowed to limp along indefinitely, proving a constant source of annoyance and loss. While these remarks apply to ordinary globe and gate valves more than to those used for reducing pressure, they are all included in the general list.

In my plant a screen of this kind was placed in the steam pipe of a pump, and the amount of iron scale, dirt, and red lead that it caught was much more than enough to prove its value, as it had to be removed frequently for several months, because it filled the screen until it was impossible to get

enough steam through it to operate the pump. The valve and steam chest on the pump were ruined in a few weeks without it, but they were replaced and have been used about three years without injury since the screen was put in. Pieces of red lead are destructive in such places, as the material hardens and when caught between a stationary and a moving part is sure to cause damage. I have found it a very good plan to dispense with it altogether and use Dixon's fine graphite instead on pipe threads, then if any of it gets on the inside of a steam pipe it can do no harm, as graphite is a good lubricant. This is the result of a combination of theory and practise.

Fig. 19 is designed for an initial pressure of three thousand pounds or less with a reduced pressure of from one to three hundred pounds. The inlet and outlet passages, indicated by arrows, are small in order to control these very high pressures, and give satisfactory service. The air or gas to be regulated enters at the left hand and passes downward through a right angle turn, which is partly or wholly closed, according to requirements, by a disk that is raised and lowered by the action of a coiled spring in one direction, and by reduced pressure in the other.

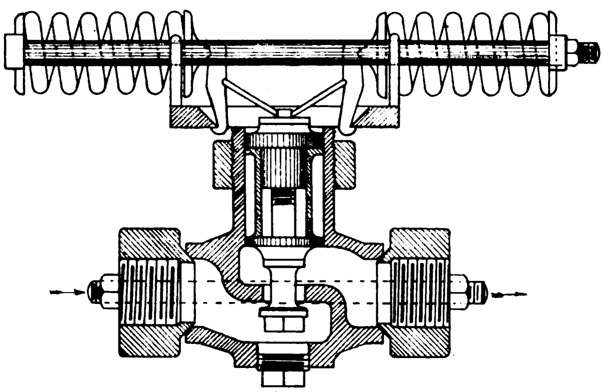


FIG. 20

Fig. 20 illustrates another valve that is designed for very high pressures. The inlet and outlet are shown by arrows. In this case the reduced pressure is controlled by two coiled springs, with links and levers whose operation has been explained. A ground joint union is provided on each side, and these are held in place by two bolts, one of which is shown in dotted lines. By removing these the valve can be taken out at any time when it is convenient to shut off the pressure.

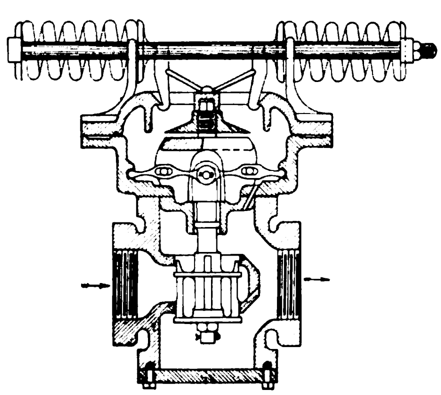


FIG. 21

Fig. 21 is a reducing pressure valve of large capacity that is designed to meet the requirements of exacting service. As shown it is in the form of a globe valve, but by removing the blank flange on the bottom and replacing it with one that is tapped for a pipe of suitable size, it may be converted into an angle valve, which is very convenient in many cases.

(*To be continued.*)

GRAPHITE.

Old Subscriber, New Haven, Conn.: Graphite is one of the very best lubricants. It should be used sparingly in oil, as it is difficult to keep in place. In the case of roller bearings it is best to mix the graphite with grease. Dry graphite should never be used, as it disappears rapidly on account of its lightness. If constantly fed graphite serves as an excellent lubricant, but mixed with good oil or grease it is very durable. Vaseline and graphite is also an excellent lubricant if the tendency to heating is not too great.—*Automobile Magazine.*

For roller bearings we would recommend Dixon's Graphitoleo, which is made of a finely pulverized flake graphite mixed with vaseline.

It will be found on trial that dry graphite will adhere to metal surfaces if there is any rubbing pressure to fasten it to the microscopic irregularities of the bearings.

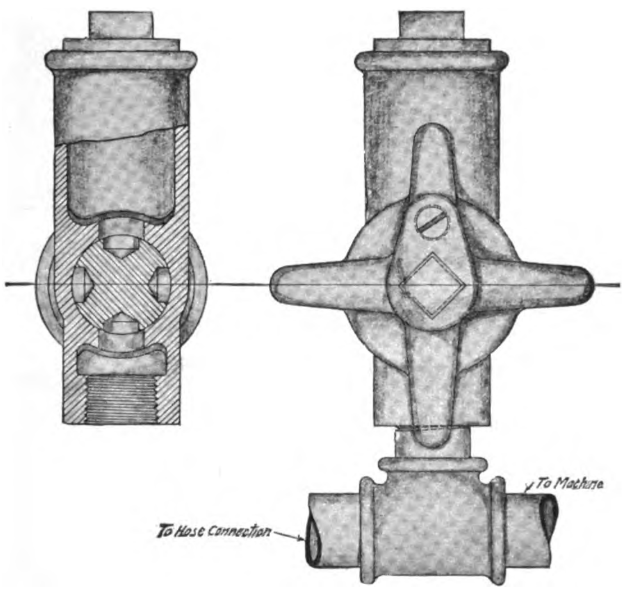
ROCK DRILL LUBRICATION.

An efficient and economical device for lubricating rock drills has just been provided by the Chicago Pneumatic Tool Company, which can be attached to any make drill, by using a standard pipe nipple and T, as shown in illustration.

This device is constructed so that at each quarter turn of the star wheel a definite quantity of oil is delivered and passes into the drill with the operating fluid.

The upper part of the oiler body is made to form a reservoir chamber for the oil, and is of sufficient capacity to hold from 50 to 60 "doses," which are measured out to the drill by turning the star wheel. One filling of the reservoir chamber will last a day's run, allowing one dose to the machine at each change of steel or more frequently if deemed necessary.

The position of the arms on star wheel coincide with the position of measuring pockets in oiler and provision is made for automatically latching in the proper positions at each quarter turn of the star wheel.



As everyone who is familiar with mine or tunnel work knows, rock drills are operated where the light is very poor, and also that in all conditions of rock or ore drilling, on the surface or underground, there always is an abundance of dust or grit, consequently the machine is liable to get ingredients introduced with the oil which cause grievous trouble in its internal organization. To prevent this a strainer is provided in the mouth of the filling chamber, which can be easily removed for cleaning when necessary.

This device is recommended to all users of rock drills, with the assurance that if they are used with a good grade of machine oil they will quickly save their first cost and at the end of a year show a handsome saving in repair parts.

The addition of a small quantity of Dixon's flake graphite to the oil will be found to be very beneficial. The graphite and oil should be mixed as thoroughly as possible before placing in the oiler. One teaspoonful of graphite to a pint of oil will give good results.—*Mining World.*

An exchange says it is better to strike some fellows when they are down than to have to run like thunder when they get up.

COATING BOILER TUBES WITH GRAPHITE.

Coating the inside of boiler tubes with a thin layer of graphite, says *The Electric Railway Review*, has given excellent results in a boiler plant using water containing excessive amounts of scale-forming salts. These deposits have required frequent drilling of the tubes. It was found by experience that much less scale adhered to the tubes coated with graphite and that the scale which did form was far more easily removed from them than from uncoated tubes.

The application of graphite might be said to have insulated the steel from deposit and thus rendered the tubes more easily cleaned; and when cleaned their interiors appeared perfectly smooth, without the usual patches of scale remaining as is the case after a tube has been bored with a turbine-cleaner. The one application of graphite so adhered to the metal that the interior of the tube had the appearance of a gun barrel, the graphite coat remaining intact after several cleanings. The graphite may be prepared for application to the interior of tubes by mixing it with pure mineral oil in an amount sufficient to form a thick paste, or it may be applied dry.—*The Electrical Age.*

EVIDENCE—PENCIL ENTRIES—LEDGER.

The case of O'Brien vs. United States, lately decided by the District of Columbia Court of Appeals, arose out of a prosecution for embezzlement by the appellant of moneys collected by him for one Hume. Witnesses were produced who testified to payments made to him. The bookkeeper of Hume identified a "credit book" in which it was the appellant's duty to enter collections made by him, and which failed to show the payments testified to by said witnesses. He further testified that it was his custom each month to make out from the ledger kept by him and deliver to the appellant statements of accounts of customers from whom the appellant was to make collections, the items in each statement being added up and the total placed at the bottom, and at the same time the total of each statement was entered in lead pencil upon the ledger account of the customer. The Appellate Court held that the trial court *properly admitted these lead pencil entries in the ledger* in evidence for the purpose of refreshing the memory of the witness and enabling him to testify as to the amount of the statement of a customer for a particular month made by him and given to the appellant for collection.

—*Bradstreets.*

"THE CAT IS OUT."

So say the manufacturers of automobiles, and the experimenters are getting excited about the wonders of vanadium steel. It is said to be vanadium that imparts strength, long life, and remarkable compression to the automobile engines of foreign manufacture.

Dixon's Ticonderoga Flake Graphite will not add strength to engine cylinders but it will add longer life and will increase the compression in a remarkable way.

Dixon's flake graphite builds up the microscopical irregularities in the metal, forming a graphite to graphite instead of a metal to metal contact, resulting in better lubrication and perfect compression.

THE ANIMALS OF THE CIRCUS.

As this time of the year is circus season we think it is not inappropriate to reproduce some interesting matter concerning that great American pastime—the circus. The following is taken from an article entitled "Side-Lights of the Circus", by Frank G. Patchin, and appeared in the May issue of *Spare Moments*. The entire article was instructive as well as entertaining, but we reprint only those portions pertaining to the menagerie.

Before a storm the animals with a tented show become nervous and excited; the lions emit a continuous coughing roar, the cat tribe paces restlessly to and fro, monkeys take to the highest perch in their cage and huddle tremblingly in the shadows, if the coming storm is to be a severe one, and the elephants sway from side to side more violently than usual, feeling the air with nervous trunks as if in search of something. Under these conditions the wise menagerie superintendent keeps one eye on the weather and the other on his charges. He frequently finds it necessary to put the side pieces on the cages to darken their interiors and quiet the beasts, and then shortens the chains with which the elephants are tethered. These animal weather prophets frequently give their storm warnings hours before the storm breaks, and they are heeded by the showman, for he dreads a wind storm.

One of the most frequent causes of loss of animals in a circus menagerie is suicide, of which there are numerous well authenticated cases. In speaking of this characteristic, George Conklin, who has been constantly associated with wild beasts for more than forty years, says: "The instinct for self-destruction is common among all kinds of animals, and the causes are, in many instances, the same as usually impel a man or woman to take his or her life. Probably the most pronounced of these causes are loneliness, homesickness, loss of companions or progeny and ill-health. There are animals that periodically have a return of the suicidal mania and that can be saved from self-destruction only by the most intelligent and careful treatment. As a rule, however, when the animal has made up its mind, so to speak, to commit suicide, nothing can prevent it, and the keeper, not only for reasons of humanity, but also because an animal in that condition is extremely dangerous, often is compelled to end its sufferings by hastening its death."

If all the animals in a circus menagerie were to escape from their cages at one time, the animal man of experience will tell you that he could capture and have them recaged within thirty minutes. Not knowing what freedom is, the animals in their new and strange environment, would seek to hide from man, whom they fear, and, as the most accessible hiding place to be found would be beneath the cages, there they would creep to. Cage sides set up against the wheels and ends would darken their retreat and there they would remain until an open cage was backed up. One glimpse of its open door and in they would go with a bound. This process would be repeated with all the animals. The one thought in the mind of the beast, apparently, is to get back. Fearing man as he does, he will not attack him at once, unless forced to in self-defence, but let him be at liberty long and he becomes possessed of a mania for killing a human being. A few years ago a circus was wrecked in the South and those of the animals not killed, escaped into a forest of scrubby second growth. It was night time, so the keepers built a circle of fire about the patch, driving the animals into the middle of it. When one was found, a large piece of canvas was thrown over him in which he soon became entangled in his efforts to get away, thus becoming an easy victim to his pursuers, and in this way all were captured.

Of wounds and sore defeat
I made my battle stay;
Winged sandals for my feet
I wove of my delay;
Of weariness and fear,
I made my shouting spear;
Of loss, and doubt, and dread,
And swift oncoming doom
I made a helmet for my head
And a floating plume.
From the shutting mist of death,
From the failure of the breath,
I made a battle-horn to blow
Across the vales of overthrow.
O hearken, love, the battle-horn!
The triumph clear, the silver scorn!
O hearken where the echoes bring,
Down the grey disastrous morn,
Laughter and rallying!

—WILLIAM VAUGHN MOODY.

PENCIL PARTIES.

One of the new things in the way of surprise parties is what is known as a pencil surprise. A lady who has been made the subject of a pencil surprise party need never borrow, beg or buy another lead pencil if the pencil surprise party has been properly worked, as she will, without doubt, have sufficient pencils of all kinds, sizes and colors to last her a lifetime.

THE OLD OAKEN BUCKET.

(Down to Date.)

How dear to my heart are the scenes of my childhood
When fond recollection presents them to view;
The orchard, the meadow, the dear tangled wildwood,
And all the loved spots that my infancy knew.

Yet one thing I can but recall with a shudder—
I wonder I live now the story to tell:
Of how I oft drank from the old oaken bucket,
The germ-breeding bucket that hung in the well.

How oft as a boy, when returning from working,
I came from the meadows where long I had toiled,
And seized the rude bucket where microbes were lurking,
To drink of the water, unfiltered, unboiled!

I might have caught typhoid, marasmus, or measles;
I wonder that ever I lived to grow up,
For using that unhygienic old bucket
Instead of employing a sterilized cup.

I thought it was sweet from the brim to receive it;
The draught so refreshing could not fail to please;
Ah, foolish I was, for I could not believe it;
That water no doubt contained germs of disease.

'Twas strange that in days of my earliest childhood
The bells of the village had not tolled my knell
For drinking bacteria out of that bucket,
The non-sterile bucket that hung in the well.

Refrain.

The old oaken bucket, the germ-laden bucket,
The death-dealing bucket that hung in the well.

—Elsie Duncan Yale *in October Lippincott's.*

TRIBUTE TO MR. JOHN A. WALKER.

From Colonial Life Ins. Co.

In a late issue of *Colonial News*, the organ of the Colonial Life Insurance Company of America, glowing tribute is paid to the memory of Mr. Walker, who was Second Vice President of this company. The first page of the *News* is devoted entirely to an article entitled: "His Words Abide", which reports some of Mr. Walker's speeches.

We reprint a letter occurring in the same issue of the *News*. This was written to the President of the Colonial Life by Manager Patrick Hughes. The sentiment expressed indicates the esteem and respect in which Mr. Walker was held.

New Brunswick, N. J., May 27, 1907.

Ernest J. Heppenheimer, Esq., President.

Dear Sir:—

While the Company is to be congratulated upon almost reaching its tenth anniversary without a visitation of death among its Officers, still, it will be more than acknowledged when the grim reaper did appear, he aimed high and hit a shining mark when he gathered to his fathers the gentle, ennobling, inspiring John A. Walker, Second Vice President of the Company. The writer learned much from his character. He seemed as sweet as country cream. His eyes, his face, his words seem before me and I think I can still hear his gentle, simple words—"without malice," pointing the road to success. He was a worker and worked in sympathy with all mankind, for he was a believer in the free and equal. When his remains are committed to mother earth, no sweeter sod was ever trod by man than the one that will cover John A. Walker. With sincere sympathy and respect, I am,

Respectfully,

(*Signed*) P. HUGHES, *Manager.*

The official announcement of Mr. Walker's death was made to the field force of the Colonial Life by its president, Mr. E. J. Heppenheimer. One cannot but mark its sad eloquence.

Hardly past the threshold of our tenth year and grateful for the unusual immunity a kind Providence has thus far bestowed on the official family of this Company, it becomes my sad duty to announce the death of our much beloved Second Vice President, Mr. John A. Walker, who departed this life on the 23rd instant, in his seventieth year.

The members of the Field Staff who will long remember his genial presence at our annual conventions which he invariably attended, though often with great danger to his health, will receive this sad intelligence with profound sorrow.

To the Officers and Directors of this Company, in whose councils his opinions and judgment were accorded deserved respect, the death of John A. Walker comes as a great personal loss.

E. J. HEPPENHEIMER,
President.

Jersey City, N. J., May 24, 1907.

DIXON AT THE COLUMBUS MEETING OF THE AIR BRAKE ASSOCIATION.

There were registered at this Convention a hundred and ninety-three members and seventy-eight guests. The Convention lasted four days (one day longer than usual). A session was held each morning and there were two afternoon sessions, showing most of the time was spent in work.

The afternoon of the first day was taken up in visiting the Blind Institution and the Ohio State Prison. In the evening those who did not attend the Brotherhood of Locomotive Engineer's Ball went to Keith's Theater. Later in the week a dance was held in the hotel.

The Dixon Company were represented by Mr. L. H. Snyder of the Jersey City office, and Mr. B. B. Worley of the Chicago office, who were busily engaged explaining the merits of Dixon's Graphite Air Brake and Triple Valve Grease, and many prominent Air Brake men said they considered this grease a friend of theirs and would not be without it, as they had eliminated nearly all the "kickers" since adopting it as a standard.

STAND PIPE, LANCASTER, PA.,

Capacity 500,000 gallons.

115 feet in height from concrete base to hood. Built by the Chicago Bridge and Iron Co., in 1903. Two coats of Dixon's Silica-Graphite Paint applied to all metal parts in 1903, have perfectly preserved the metal and the paint presents an attractive appearance at this time.

PROTECTIVE PAINT.

The protective paint question is one of long and varied discussion and experiment, each paint manufacturer claiming that after years of careful study and trying out, the solution of the protective paint question had been settled.

The majority of authorities acknowledge that a linseed oil paint affords the better protection for structural steel, metal and wooden surfaces. The oil paint is also more economical by reason of its ease of application and better covering power.

Much time and money has been spent in the manufacture of an oil protective paint that in itself has no destructive qualities, but must be destroyed by the atmospheric conditions or artificial heat and gases to which it may be subjected.

The life of the oil is the life of the paint and on the life of the paint depends the protecting quality. To further these ends the best boiled linseed oil must be used and inert pigments, that is, pigments that have no chemical action on the oil. The prevailing conditions of nature only too soon perform this destroying feature.

The two pigments that today are being used successfully in protective paints are silica and flake graphite.

The silica is inert, unaffected by heat and gases and gives the paint a good, heavy body. The graphite is light, flake-like in formation, forming a compact shield-like surface to protect, contains great lubricating qualities which afford an easy application of the paint, is unaffected by heat and gases and when properly mixed with the silica and linseed oil, an unrivaled protective paint is assured, which adheres to the surface applied and forms a perfect protective coating.

Probably one of the most interesting treatises on the protective paint question has been published by the Joseph Dixon Crucible Company of Jersey City, entitled "Philosophy of Protective Paint."—*W. F. Swearer.*

CREDITS THAT KILL.

G. W. Tinkey.

No man ever did business on a loose credit policy and survived. Free credit will kill a business in time. Credit is like the trickling stream that undermines the dam, until with a rush the waters go through, carrying destruction with them. The blacksmith who has been loose in his credits, not only loses himself, but others lose with him, as the innocent suffer with the guilty. Credit methods have changed in late years all along business lines. The jobber has drawn tighter rein, not to benefit himself only, but for the good of the trade. The jobber steps in and becomes, in an important degree, a balance for a large number of those who are honest, but who lack in ability to buy within proper limits. The smith has come to appreciate this and generally likes it. He finds he is making more money than he did under the free policy of doing work and selling his products without regard for the ability of the buyer to pay. Business is conducted to make money, and money cannot be made by selling to or working for a "dead beat." Of course, there are those who are perfectly honest but have not the ability to pay, although they think they have. Men lack courage when it comes to talking credit. There are those so clever that they can obtain credit, in face of the fact that they have not paid previous bills and owe at that moment. It takes an extra good man to stand against all that is before him and come out ahead. Having tried the cash business for eighteen months, I have more friends, less trouble, and just as much money. One does not have to do as much work, or turn away an honest man, as when working for the "dead beat." It's a pleasure to work for money, but not very pleasant or encouraging to work for nothing.—*American Blacksmith.*

THE QUESTION.

O Sun, in the heavens stand still!
Moon, pause on your wonderful way!
A question the earth shall soon fill—
Await ye the answer, I pray!
They've found it! The soul of a man!
What marvel of science more great?
Imagine it, please, if you can—
A spirit—located by weight!
Now this is the question, I say—
Come out, O ye wise, from your dens,
And answer me truly to-day,
Are Women's souls bigger than Men's?

Lurana W. Sheldon, in *New York Times.*

LUBRICANT FOR BALL BEARINGS.

Motor Age says: "The proper lubricant for ball bearings is thin grease or vaseline. Stiff grease is not desirable and graphite is practically useless for this purpose. If graphite grease is used it should be reduced with oil unless it is thinned to start with, and even then it will owe its efficiency to the grease and oil and not to the graphite."

To this we must take exception so far as the matter of graphite is concerned. If the graphite grease owes its efficiency to the grease and not to the graphite, why should graphite be used at all? As a matter of fact, the efficiency of the grease depends upon the graphite, the grease being the vehicle to carry the graphite to the open bearing surfaces.

That we may speak with authority, permit us to say that tests of graphite as a lubricant for ball and roller bearings have been made by Professor Goss, of Purdue University.

The summary of the results of Professor Goss are shown in tables and graphically as well, but these drawings cannot well be represented here. Later on we shall reproduce them in pamphlet form.

In all the tests, whether with kerosene alone, or with oil alone, or with vaseline alone, by the addition of about 4% of Dixon's Motor Graphite the coefficient of friction was greatly decreased.

The tests, in the opinion of Professor Goss, justify the following general conclusions concerning the lubrication of bearings.

1. An oil as light as kerosene, when inter-mixed with Dixon's Graphite, will be converted into an effective lubricant for ball bearings when operated under light or medium heavy pressure.

2. A combination of graphite and lard oil makes up a lubricating mixture which, when applied to ball bearings, will accomplish everything which lard oil alone will do and which, at the same time, will give a lower frictional resistance of the bearing and permit a large increase in the load which it may be made to carry.

3. Even so viscous a lubricant as vaseline will better perform a given service in the lubrication of ball bearings when supplemented by small amounts of graphite. The bearing to which the mixture is applied will work with less frictional resistance and will carry a heavier load than when vaseline alone is used.

4. Comparing results obtained at 300 revolutions per minute, it appears that a ball bearing lubricated with a mixture of vaseline and graphite will work as easy as when supplied with lard oil alone, notwithstanding the fact that with the more viscous mixture it will carry a much heavier load.

5. The admixture of graphite with either a liquid or a viscous lubricant serves both to reduce the friction and to increase the possible load which a bearing thus lubricated can be made to carry.

6. The beneficial effects to be derived from the use of graphite in combination with other lubricants in the lubrication of ball bearings are most pronounced at speeds which are comparatively low, but the beneficial effect appears under all conditions of speed within the range of experiments.

7. The preceding statements all refer to mixtures of graphite and other lubricants in the proportion of 4% graphite with 96% of other lubricants, proportion by weight.

These tests by Professor Goss fall in line with the observation of those who have made grease tests with Dixon's Pure Flake Graphite in ball and roller bearings.

The Dixon Company has always contended that graphite (in the proportion of from 2 to 5% by weight) largely decreased friction, and although we have very many testimonials to the correctness of our opinion and belief, yet we have had no scientific foundation to rest our case on until now, but now with the exhaustive tests of Professor Goss we trust there will be no further need of questions regarding the value of graphite as a lubricant.

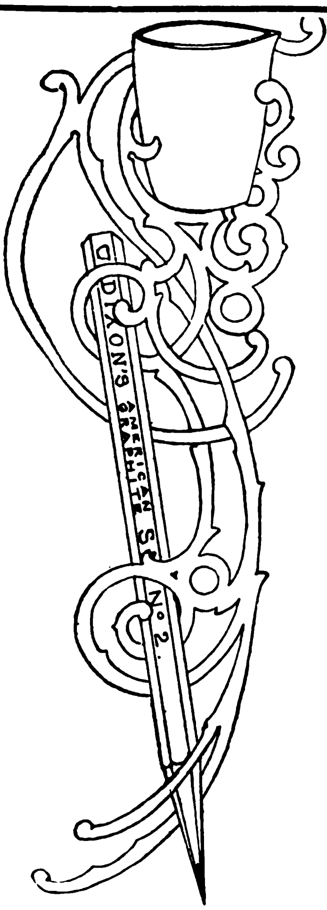
AUTOMOBILE CHAINS.

NOVICE, Binghamton, N. Y.—I have studied engineering a little and have some knowledge of work lost by friction. In observing my automobile working I am convinced there is considerable lost work in the chain. I have tried all sorts of grease, but the chain does not pass over the sprockets freely. Can you recommend anything to help me out? A.—Use Dixon's Motor Chain Compound. Clean the chain properly, then apply the compound. We use it and know whereof we speak.—*Automobile Magazine.*

Graphite

Vol. XI. AUGUST, 1907. No. 8.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



SCALPED CRUCIBLES IN SUMMER AND WINTER.

The season is now approaching when the crucible manufacturer will find an increase in his complaints from scalped pots. The summer months, with their damp weather, are sure to cause him trouble among the small crucible consumers.

During the winter months, brass foundries are usually dry and the air is not saturated with moisture. The windows are kept closed, too, so that conditions are not nearly as bad as in the summer season.

In summer, however, all the windows of the foundry are allowed to remain open, many of them during the night, so that the condition could scarcely be better for saturating the pots with moisture. In many brass foundries it is practically equivalent to leaving the crucibles out in the open air. A case was brought to our notice during the summer of 1906, of a lot of crucibles that had been stored "in a dry place on the top of the flue back of the furnaces," as the foundry proprietor said. This "dry place" was before windows which were allowed to remain open during the entire summer in order to cool the foundry. A good rain thoroughly soaked the crucibles.

The large brass manufacturer does not have the difficulties with scalped pots that are experienced by the small brass foundry. He purchases his crucibles in large lots and allows them to season for some time before using. He is also cognizant of the fact that they should be stored in a dry place and no better one can be found than on the top of his annealing muffles. These are warm practically night and day throughout the year.—*The Brass World.*

KEEPS RUST FROM TOOLS.

To keep iron and steel goods from rust, states the *Mechanical World,* dissolve half an ounce of camphor in 1 pound of hog's lard; take off the scum, mix as much blacklead as will give the mixture an iron color. Iron and steel goods rubbed over with this mixture, and left with it on twenty-four hours, and then dried with a linen cloth, will keep clean for months.

The above has appeared before in GRAPHITE, but it is good enough to appear again.

FIRST PRINCIPLES OF DRYING.

A substance becomes dry by the evaporation of its inherent moisture into the surrounding space. If this space be confined it soon becomes saturated and the process stops. Hence, constant change is necessary in order that the moisture given off may be continually carried away.

In practise, air movement is therefore absolutely essential to the process of drying. Hence the necessity of forced circulation by means of a fan, when positive and equable results are desired. Heat is merely a useful accessory to decrease the time of drying by increasing both the rate of evaporation and the absorbing power of the surrounding space.

It makes no difference whether this space is a vacuum or filled with air; under either condition it will take up a stated weight of vapor. From this it appears that the vapor molecules find sufficient space between the molecules of air. But the converse is not true, for somewhat less air will be contained in a given space saturated with vapor than in one devoid of moisture. In other words, the air does not seem to find sufficient space between the molecules of vapor. If the temperature of the space be increased, opportunity will thereby be provided for the vaporization of more water, but if it be decreased its capacity for moisture will be reduced, and visible water will be deposited. The temperature at which this takes place is known as the "dew-point," and depends upon the initial degree of saturation of the given space; the less the relative saturation the lower the dew-point.

The capacity of air for absorption, or more properly speaking, the amount of vapor which a given space will contain, increases rapidly with the temperature. It is principally for this reason that heat is such a valuable accessory to the drying process. Upon these principles has been developed the blower type of kiln in which all the heating surface is massed in connection with the fan which forces the warm air into contact with the material to be dried.

GRAPHITE HYDRANT GREASE.

We are advised by the Water Department of a prominent Pennsylvania city that the contract for their fire hydrants for the coming year has been awarded to a company manufacturing fire hydrants, and that the specifications require that the working parts of all of the fire hydrants and gate valves be coated with Dixon's Waterproof Graphite Grease.

If this article meets the eye of any one interested in fire hydrants, it will convey the information that for fire hydrants there is nothing superior and probably nothing equal to Dixon's Waterproof Graphite Grease.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Black Lead.

DIRECTORS:

Edward F. C. Young, William Murray,
George T. Smith, Edward L. Young,
George E. Long, Joseph D. Bedle,
Harry Dailey.

OFFICERS:

President—Edward F. C. Young,
Vice Pres.—George T. Smith,
Treasurer—George E. Long,
Secretary—Harry Dailey,
Attorney—Joseph D. Bedle.

BRANCH OFFICES:

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Oakland, Cal., 1325 Jackson Street.
Boston, Mass., Paddock Building.
Pittsburg, Pa., Farmers' Bank Building.
St. Louis, Mo., Victoria Building.
Washington, D. C., 925 Colorado Building.
Baltimore, Md., 1005 Union Trust Building.
London, Eng., 26 Victoria Street.

MORE ABOUT GRAPHITE AS AN AUTOMOBILE LUBRICANT.

The following article appeared in the June, '07, issue of *Automobile Magazine:*

"S. K., Larchmont, N. Y.—It is not necessary to make any particular change of oil in warmer weather. The temperature near the gasoline engine is nearly the same all the year round. The oil cups should be placed near the motor, where the temperature is constant. The lubrication problem is one depending materially on the design of the motor car, some vehicles requiring many more cups than others. It may be added that graphite is a fine lubricant if sparingly used, and when made into a paste with grease is very useful in lubricating roller or ball bearings."

Our booklets, "Dixon's Motor Graphite, A Good Thing," and "Overhauling a Car," have much useful information in them, and every person interested in automobile operation should have a copy, which will be sent free by writing us.

WHY THE MOTOR RAN SMOOTHLY.

The following letter comes to us from Shelton, Nebraska. We do not know whether the writer would object to our reproducing his name, but we have thought it best not to do so:

Shelton, Neb., May 28th, 1907.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Dear Sirs:—Your inquiry of the 25th is at hand, and in regard to the graphite you sent me for my automobile will say that I have given it a thorough test and I find it gives excellent results. I use it in my motor crank case mixed with the lubricating oil; the result is that the motor runs smooth and quiet, which tells me it reduces friction to a minimum. Everybody remarks how quiet my car runs, not only that but I am saving gasoline. I intend to make an application into my transmission. Your graphite is to be once tried to be appreciated. I do not think there is any lubricant that is so effective of good results as your graphite if applied judiciously. I can recommend Motor Graphite to all who use the motor car and I always give it a good word when conversing on the subject of lubrication.

Very truly yours,
D. H.

EXCELLENT RESULTS OBTAINED BY DIXON'S MOTOR GRAPHITE, MODEL F FORD CAR.

Warsaw, Ind., June 1st, 1907.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Dear Sirs:—The sample of Graphite you sent me I used on my two cylinder *Model F* Ford in all the grease cups. I mixed the grease (lard oil) and graphite, then added cylinder oil to make it soft enough to work good in grease cups, and that made as fine and smooth a grease as I ever saw and is lasting and does not run like grease alone, the graphite seems to hold it together even though it is very soft. I expect to use the same in the transmission, as I ordered a supply of graphite. I have been engaged in the sale of threshers, engines and heavy machinery for twenty years, and whenever we had a hot box graphite, as a rule, would cure the trouble. I think it is the best lubricant I have ever tried.

Very truly yours,
H. T. M.

The reason we don't recommend this practise more is because as a rule there is a tendency on the part of the user, when making his own mixture, to use too much Graphite. When our special prepared Greases are used you are sure that they have just the right amount of Graphite in them for the particular work, carefully determined after years of experience and scientific study.

It is said that the word crucible comes from the habit of old time alchemists putting crosses (cruces) on their melting pots. This was done with the idea that it would keep the devil out of the pot or for spoiling the result aimed at. This is a good explanation, but probably false.

It is said that the average New York city family is larger than is generally supposed, as it averages four and six-tenths persons.

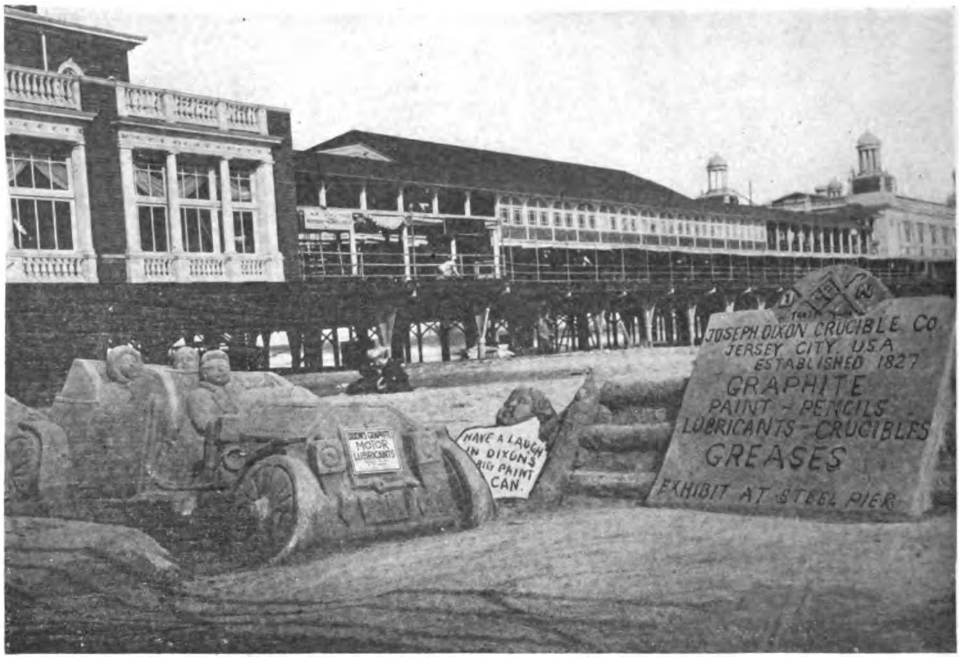
DIXON'S GRAPHITE EXHIBIT, STEEL PIER, ATLANTIC CITY.

American Railway Master Mechanics' Association, Master Car Builders' Association.

Dixon's originality has made a decided impression on the world since 1827, when Joseph Dixon originated Graphite Crucibles, and Stove Polish. In the eighty intervening years, the reputation for originality in discovering uses for graphite and in the advertising of these uses, has been successfully maintained by the Joseph Dixon Crucible Company. The latest success was the originality of building a portable steel exhibition booth for the Atlantic City Convention. The steel booth illustrated, was built by Post & McCord, Steel Contractors, New York City, who are building two-thirds of the steel skyscrapers in New York, and while Dixon's Steel Booth measured but 21′×21′ with a height of 14′, yet it showed in every part the same perfection of construction as marks Post & McCord's building of towering office buildings.

The purpose of this original exhibit of a structural steel building, with a corrugated iron roof, was to show the tenacity, elasticity and appearance on steel of the four colors of Dixon's Silica-Graphite Paint, with which it was painted. Within the steel booth was another of Dixon's original advertising ideas, the largest paint can in the world, measuring eight feet in height, six feet in diameter, twenty feet in circumference, with a handle three feet above the can, and an opening and exit in the can, six feet high, two and a half feet in width. The appearance of the can was very striking with the silvered top and bottom in imitation of tin and the reproduction of the famous Dixon orange-colored paint can label, telling of the wide range of uses for the original graphite paint—Dixon's Silica-Graphite Paint.

Visitors were invited within the can to enjoy an original Dixon arrangement of distorting mirrors—the face and body distortions made the big paint can the most popular and enjoyable exhibit on the Steel Pier. Three notable Atlantic City structures were shown in the big paint can, the Chelsea Hotel, which has its metal roof protected from the sea air with Dixon's Dark Red; The Haddon Hall Hotel, which has its roof protected with Dixon's famous Natural or Slate Color, and the United States Absecon Light House, which has the center division protected with Dixon's Black. A sign on the corrugated steel roof of the shelter at the extreme end of the Steel Pier announced that the roof is protected from the heat of the sun and sea air with Dixon's Natural Color, which after three years' full exposure, is in a perfect, unbroken condition. Displays and demonstrations were made in the Booth of the uses of Dixon's Graphite Crucibles, Lubricants, Greases, Paint, Motor Brushes, Pencils, Air Brake Grease, Foundry Facings, and Pipe-Joint Compound.



THE HAND-WRITING IN THE SAND,

at the entrance to the Steel Pier, Atlantic City, N. J., during the June Convention of the American Railway Master Mechanics' Association and the Master Car Builders' Association, brought the name of Joseph Dixon Crucible Company prominently to the attention of thousands of railroad officials, manufacturers and visitors from all parts of the world.

This unique Dixon advertisement in the sand was made by Atlantic City's famous sand artist, whose work has been illustrated and described in the monthly magazines.

The first large figure was that of an automobile containing a newly married couple, with the ever present good luck shoe on the running board, rice throwers, dogs chasing the machine and other little details appropriate to a wedding party, worked out in the sand. On the front of the touring car was the inscription, "DIXON'S GRAPHITE MOTOR LUBRICANTS INCREASE THE LIFE OF THE MACHINE." This is a fact attested to by thousands of automobilists in the United States and foreign countries. Alongside of the sand automobile was built a sand fence over which peered an exaggerated sized head, smiling at the discomfortures of the wedding party. On the shirt bosom of the figure, was a sign, "Have a Laugh in Dixon's Big Paint Can." On another part of the fence was a very large sign bearing mute witness to the fact that the name of the Joseph Dixon Crucible Company has had a life of eighty years, with the famous Dixon's trade mark, and a few of the graphite products outlined by name in the sand.

The "Hand-Writing In the Sand" perished after the Convention, but the visitors will long remember the sand figures arranged by the Joseph Dixon Crucible Company for the edification of the young and old, present and prospective users of Graphite Paint, Pencils, Lubricants, Crucibles, Greases, Motor Brushes, Foundry Facings and Pipe-Joint Compound.

WE ARE TOLD that New York city's Aquarium is growing in popularity, and now has an average of 6,420 visitors each day. On holidays the attendance is sometimes as high as 18,000.

SEXTET OF DIXONITES AT ATLANTIC CITY CONVENTION,

Railway Master Mechanics' Association, Master Car Builders' Association.

The blue enameled numbered badge of the Supply Men's Association, with a minature reproduction of a can of Dixon's Silica-Graphite Paint attached to the coat lapel, served to identify the representatives of the Joseph Dixon Crucible Company at the June Conventions.

This active field force, photographed in front of Dixon's Graphite Exhibit, hails from different sections of the United States, where the members are favorably known to railroad officials and manufacturers in the respective Dixon territories.

The Atlantic City Conventions afforded many excellent opportunities to the Dixon representatives for strengthening and increasing the large international list of users of Dixon's various graphite products. Intelligent explanations and practical demonstrations were cheerfully made of the merits and uses of Dixon's graphite products. Visitors were presented with one of our products—DIXON'S ETERNO INDELIBLE PENCIL—with which they signed the register card. The Dixonites' slogan was, "Welcome Everybody," and thousands of callers at Dixon's Graphite Exhibit will remember the courteous attentions of the following gentlemen; reading from right to left, standing, Mr. W. A. Housten, Baltimore, Md.; Mr. J. J. Tucker, Philadelphia, Pa.; Mr. A. C. Bowles, San Francisco; seated, Mr. H. A. Nealley, Boston, Mass.; Mr. C. H. Spotts, Jersey City, and Mr. L. H. Snyder, Jersey City.

The Dixonites will be glad to meet you face to face at your office, and in 1908 at the Atlantic City Conventions of the Master Car Builders' and Master Mechanics' Associations.

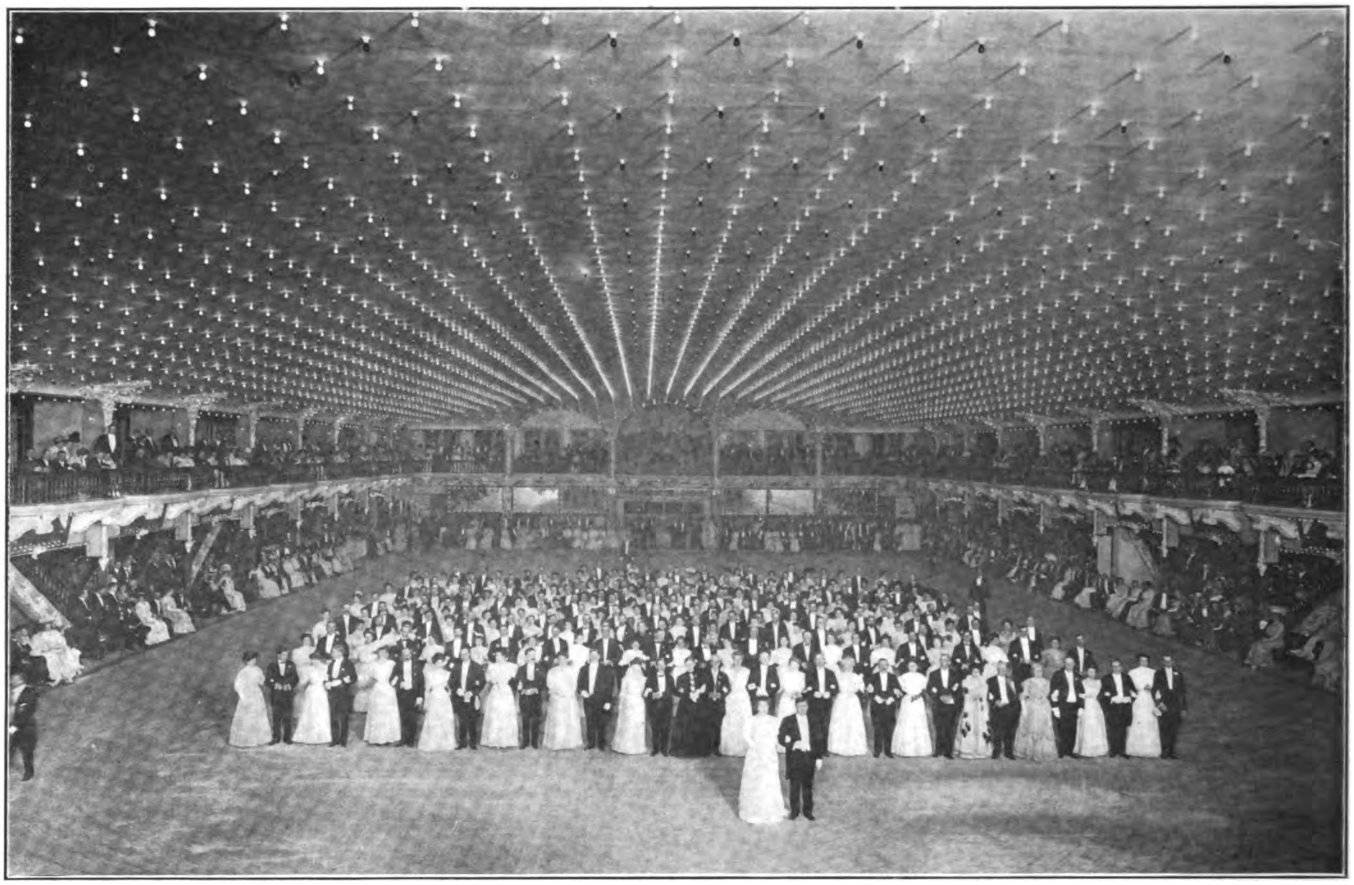
IT IS SAID that the sale of spirituous liquors is increasing rapidly in New York city, and more noticeably so in Manhattan and the Bronx, which are selling liquor under two hundred more certificates from the State Excise Department than were issued last year.

DIXON'S graphite publications sent free upon request.

SEXTET OF DIXONITES AT ATLANTIC CITY CONVENTION.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION—MASTER CAR BUILDERS' ASSOCIATION.

(DESCRIPTIVE ARTICLE OPPOSITE PAGE.)



FORTIETH GRAND ANNUAL BALL, AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.

Young's Million Dollar Pier, Atlantic City.

Railroad officials and manufacturers from all over this continent gather together every June for the purpose of discussing complicated problems of construction and operation of railroads. Elaborate exhibits of railroad appliances arranged by the manufacturers are carefully inspected by the railroad officials from every branch of the service. In addition to the work accomplished in the Convention Hall, an opportunity is always given the delegates, guests, manufacturers and supply men to meet frequently at social affairs. The entertainments are arranged and directed by the Committee of Arrangements of the Railway Supply Men, who work earnestly throughout the week to give every one a good time, and they always royally succeed. All those wearing official badges were entitled to the free use of roller chairs, on the famous boardwalk, during the day. The badges also secured for the wearer special suites and prices at Atlantic City's high-class bathing house, the Adams' Baths. Free long distance telephone service to any part of the United States, between the hours of 6 P.M. to 9 A.M., was courteously extended to wearers of the official badges by the Delaware & Atlantic Telephone Company, the Bell Telephone & Telegraph Company of Philadelphia, and the American Telephone & Telegraph Company.

The illustration shows the Fortieth Annual Grand Ball of the American Railway Master Mechanics' Association, at the close of the Grand March on the evening of Thursday, June 13th. Those present will never forget the scene, as it was the most picturesque ball that has ever been given. The grandeur of the ball room with the novel lighting effects, produced starlight, moonlight, sunlight, and novelties never heretofore attempted in a ball room.

The entertainments during each day of the American Railway Master Mechanics' Association consisted of band concerts, mornings, afternoons and evenings on the Steel Pier by Vessella's Italian Band of forty pieces, and the Royal Berlin Orchestra and Band of thirty-five pieces, in addition to the Ladies' receptions each afternoon, where appeared the noted artists, Mr. Robert Craig Campbell and Miss Carrie Jacobs Bond. Informal dances were held Wednesday and Friday evenings in the Ball Room of the Marlborough-Blenheim, with the Fortieth Annual Grand Ball on Thursday evening. The crowning feature of this year's social events was the Song Recital in the Music Hall by Mme. Schumann-Heink. Saturday was given over to automobile trips, the Supply Men's Annual Baseball Game—(the West defeated the East), and to the Grand Progressive Euchre Party for convention ladies, held in the Solarium of the Marlborough-Blenheim. Sunday a special concert was given by Miss Carrie Jacobs Bond, and special band concerts on the Steel Pier.

Monday morning, the 17th, the Master Car Builders' entertainments started with the Grand March to the Steel Pier, and thereafter daily morning, afternoon and evening concerts on the Steel Pier by Vessella's Italian Band and the Royal Berlin Orchestra Band. The afternoon receptions of the ladies were largely attended to hear Mr. Irvin Myers and the Russian Symphony Trio, assisted by Miss Marjorie Naioma Riley. A most enjoyable entertainment was given Monday evening in the Music Hall by the Supply Men's Amateur Vaudeville Club. The numbers were decidedly unique and made a hit. It is understood that some of the Supply Men appearing have been offered professional careers in the legitimate, but they can't be spared in the supply field.

The Forty-first Annual Grand Ball of the Master Car Builders' was held Tuesday night, the 18th, on Young's new

BOARD WALK, STEEPLE CHASE PIER AND STEEL PIER, ATLANTIC CITY, N. J.

Million Dollar Pier and it equalled in attendance, grandeur and enjoyment the Grand Ball of the Master Mechanics.

No other publication has described in detail the many pleasing entertainment features provided by the Supply Men's Association, and we are confident our readers who were in attendance and those who were not, will appreciate this portrayal of an important feature of the Annual Meetings.

THE PRACTICAL VALUE OF BEING ABLE TO PUT YOURSELF IN THE OTHER MAN'S PLACE.

By R. T. Crane.

Conducting a business like that of Crane Co. presents many problems, not the least of which is the persuading of the men who work for you to see things through your eyes.

It is a wise and profitable policy to cultivate the habit of putting yourself in the other man's place. Such an attitude has many advantages and few drawbacks.

Aside from directing the general policy of an extensive business, it is practically impossible for the man at the head to do everything himself, or to know always just what is being done. He must depend to a large extent on others, and the ease with which he manages his business rests considerably upon the manner in which these others perform their work.

To make this clear and specific, let me say that putting yourself in my place has to me two distinct and important sides, and they should be just as distinct and as important to those who are employed to carry out my policy.

In the first place, it means doing things as I should do them had I the time; in the second place and still more important, it means keeping me informed of what is going on where it is practically impossible for me to keep in touch with everything.

The kind of information I want must be considered. I don't wish simply to be tickled with facts and incidents; I want to know of defects, if any exist. I wish to know the unpleasant things as well as the things that please. How am I to go about the correction of mistakes, the remedying of defects, if I do not know they exist? To strengthen the weak spots it is essential first of all to know their nature and where they are. The man who puts himself in my place will be just as ready to give me information that points to a defect as to tell me where he finds the business strong and the details gratifying.

There seems to be too much of a tendency today among employees to assume that the head of the business would not be interested in this or that detail. This is a wrong attitude.

Not only is it for the head of the business to decide how he wishes his work carried on, but it also is for him to determine what information he wishes regarding the business. And he should be able to get this information without having to ask a long string of questions or happen upon it by accident.

In the business world, putting yourself in the other man's place simply means keeping out of a rut, avoiding the doing of your work like a machine, using your head as it ought to be used.

Get the other man's point of view; and, if this man be your employer, then act in all things intelligently, frankly, quickly, and loyally.—*The Valve World.*

A GOOD SHOWING FOR DIXON'S GRAPHITE AIR BRAKE AND TRIPLE VALVE GREASE.

An air brake inspector of one of the large trunk lines told one of the Dixon representatives that his road was testing Dixon's Graphite Air Brake and Triple Valve Grease on their fast passenger locomotives with very good results, and that since using Dixon's Grease there had not been a single complaint regarding improper working of the air.

To any railroad man who is having undesired quick action or other air brake troubles, and desires samples of Dixon's Air Brake and Triple Valve Grease for testing purposes, we would be glad to send the same free of cost.

Dixon's graphite publications sent free upon request.

PRESSURE REDUCING VALVES.

By W. H. Wakeman.

Chapter IV.

Fig. 22 illustrates a spring-loaded valve in which the spring is concealed, making the whole seem very compact. The reduced pressure is conveyed to the diaphragm by the small pipe shown, and as the space in the lower part of it is always filled with water, as well as the pipe, the rubber diaphragm will last for many years.

This valve can be adjusted in two ways for different purposes. The long nut directly above the spring is used to raise or lower the reduced pressure to suit requirements. For illustration, when it is loosened as far as practicable it will give three pounds pressure on the lower side, with a certain spring. When this nut is screwed down as far as it will go, thus tightening the spring, the pressure will rise to six pounds. The thumb nut directly above the larger one is for raising or lowering the limits of pressure, but does not change the range of it.

A recent improvement in this valve consists of the addition of a double lever attachment, whereby a greater pressure can be secured on the outlet side than is possible without it, as it may be raised to fifty pounds if desired. This will not be wanted in many cases, but if not needed the levers can be detached, provided the lower pressure is within the limits of the spring.

The internal construction of the valve, where steam passes through, is not shown, but it is so designed that in operation it is nearly noiseless. One of these is now being installed in a certain plant not far from my engine room, where another was removed solely because it made too much noise. This point is mentioned because purchasers should bear it in mind. Where more or less noise is not objectionable, a cheap valve may answer every purpose and give satisfaction, but in another place a more expensive kind may be demanded. It is not always a pleasant job to remove one of these valves, especially as the piping will probably not admit the new one until it is changed, and after steam has whistled through a pipe for several years, heat causes the threads to become very firmly fastened in place, especially if red lead was used when the joint was made up. Before an effort is made to unscrew such a joint, kerosene oil should be put on it and given time to work its way into the minute crevices, thus loosening the red lead as much as possible. It is generally necessary to hammer the fitting until there is great danger of its being broken to complete the loosening process, and even then so much strain must be put on the chain tongs that it threatens to crush the pipe, and sometimes it is spoiled in this way. If a piece is broken out of the fitting a new one is secured, and there is no special danger of failure at this point, but if a slight crack is started and not discovered, the pressure of steam, to which is often added much strain due to expansion that was not provided for when the system was designed, may cause it to suddenly break and fill the room with steam, causing loss of life and destruction of property.

All of this expense and trouble may be saved, or greatly reduced, by using Dixon's Pipe-Joint Compound, provided it is put on to cover every part of each thread, and is allowed to form a thin coating between the wrought and cast iron forming the pipe and the fitting. Good results cannot be expected if the compound is put on carelessly, so that much of the surface is not touched by it.

Fig. 23 illustrates a valve that is quite different in some respects from those previously described. It is operated in a similar way, as pressure from the low side communicates with a diaphragm chamber, the effect of which is opposed by a spring. In this case the operating mechanism is above the valve in the pipe, which gives it a different appearance, but the valve itself is of another design. Some of these valves are of the piston type, or, in other words, they consist of a round plug sliding in a round hole. This expression describes them accurately, although it may not be the most refined that could be selected. Such a valve will not shut off absolutely tight, because it is not practicable to make it fit perfectly and still move easily, but it shuts tight enough to be satisfactory in all ordinary service, because at least a small amount of steam will always be used, and when the service is to be discontinued the stop valve in front of the pressure-reducing valve will be closed.

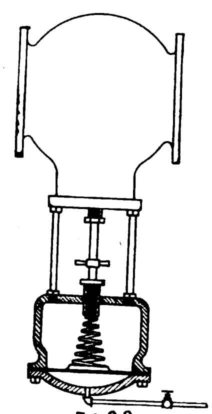


Fig. 22.

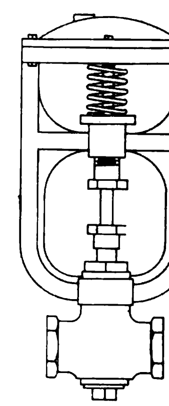


Fig. 23

Fig. 23 belongs to another class known as the single-seated type, because it resembles a globe valve, therefore it will shut tight when sufficient force is brought to bear on it, and although the available pressure for its operation may not be more than two or three pounds, still when we consider that a six inch diaphragm contains twenty-eight square inches, a greater portion of which are available for pressure to act on in closing the valve, it is plain that if the disk and seat are in good order, steam can be shut off completely. One great advantage of this kind of valve is that if the disk is cut or grooved by steam rushing through it, a new one can be put on in a few minutes, and if the seat is damaged in the same way it can easily be made good by the use of a valve reseating machine.

This valve is made to take a maximum pressure of 125 pounds on the inlet side, and reduce it to a minimum of one pound at the outlet, but owing to its unbalanced construction the largest size made is for two inch pipe.

(To be continued.)

Lawyer: Do you swear positively that you know more than half this jury?

Witness: Yes, sir, and now that I have taken a good look at 'em I'll swear that I know more than all of 'em put together.—*Pawtuxet Valley Gleaner.*

AUTOMOBILE LUBRICATION.

The chains should be removed and washed in coal oil and wiped dry and then graphite rubbed on to lubricate.

Graphite is recommended by some manufacturers not only for the chain but also to be mixed with the lubricating oil for the cylinder, as the graphite "stays put," that is, sticks to the surface, filling out any irregularities and thus reducing the friction. This means less lubricating oil. It is claimed that the power of the engine is increased as the pressure is less liable to leak past the pistons. It will also prevent cutting, and cases have been cited where cutting had started but ceased on the application of graphite. One automobile concern recommends the following mixture: To each pint of lubricating oil one teaspoonful of graphite, this to be well shaken so that the graphite is held in suspension. Only a force feed lubricator can be used, as the graphite might otherwise clog the oil pipes.

In conclusion, see that there is plenty of the right kind of lubricant and that it gets to the place to be lubricated.—*Motor Vehicle.*

DIXON'S GRAPHITE BRUSHES.

Prevent any Impression of Wear on Commutator and Overcome Many Troubles.

The following letter comes to us from the chief electrician of a large and important steel company, whose name we do not feel at liberty to quote.

"Dixon's Graphite Brushes give us entire satisfaction. From what I know of these brushes they are superior to any other brushes that I have ever seen in use. We have been testing a set of these brushes on a twenty horse power Westinghouse open-type Motor of 220 volts, alongside of a motor of the same type and size, and find that the commutator running with the Dixon Graphite Brushes has not the impression of wear and has a glassy surface, whereas the one next to it is considerably worn and has deep scores in the commutator. In addition to this I believe that Dixon's Graphite Brushes will overcome many other troubles.

"I have had experience with motors for about fourteen years and have always found that where you have to use oil or other lubricants, it saturates the mica and thus allows the segment bars to short-circuit.

"We are now sending our purchasing agent an order for sixteen dozen of various sizes of Dixon's Graphite Brushes."

Why Thunder Sours Milk.—Milk, like most other substances, contains millions of bacteria. The milk bacteria that in a day or two, under natural conditions, would cause the fluid to sour, are peculiarly susceptible to electricity. Electricity inspirits and invigorates them, affecting them as alcohol, cocaine or strong tea affects men. Under the current's influence they fall to work with amazing energy and instead of taking a couple of days to sour the milk they accomplish the task completely in half an hour. It is not the thunder in a storm that sours milk; it is the electricity in the air that does it. With an electric battery it is easy, on the same principle, to sour the freshest milk. A strong current excites the microbes to supermicrobic exertions, and in a few minutes they do a job that under ordinary conditions would take them a couple of days.—*Boston Budget.*

PLATING PLASTER OF PARIS FIGURES.

Question No. 280. In coating plaster of Paris figures over with graphite preparatory to copper plating them for producing the verde-antique, I have been unable to obtain a smooth coating with the graphite. What is the trouble?

Answer: The difficulty is in the graphite. A special graphite is made for this purpose which, we believe, contains a small quantity of clay to make it adhere. The graphite is very fine and produces a smooth surface that is perfectly adherent. What you have been using is undoubtedly flake graphite which will not adhere perfectly to the surface.

Dixon's No. 643 graphite is made for this purpose and will give you the necessary adherence.—*The Brass World.*

TWO MILES A MINUTE.

Twomilesaminute
Geehowwefly!
Swiftasameteor
Streakingthesky.

Whatisthatblur?
Onlythetrees,
Lookatthemwave.
Mywhatabreeze!

Ahonkandarush,
Aflashandasmell—
Whatdidwehit?
Didsomebodyyell?

Ajarandascream—
Itlookedlikeahorse;
Notellingnow,
Keeptothecourse.

Outoftheroad!
Giveusashow!
Twomilesaminute,
Geehowwego!—*Newark News.*

MEASURES IN THE BIBLE: THEIR EQUIVALENTS.

A gerah was 1 cent.
A farthing was 3 cents.
A talent of gold was 13,800 dollars.
A talent of silver was 533.33 dollars.
A bin was one gallon and two pints.
A shekel of silver was about 50 cents.
A cubit was nearly 22 inches.
A mite was less than a quarter of a cent.
A piece of silver or a penny was 13 cents.
A Sabbath-day's journey was about an English mile.
An ephah, or bath, contains seven gallons and five pints.
Ezekiel's reed was nearly 11 feet.
A day's journey was about 23 1-5 miles.
A firkin was seven pints, an omer was six pints, a cab was three pints.
A hand's breadth is equal to 3 5-8 inches.
A finger's breadth is equal to one inch.—*The Evangelist.*

Anyone can sympathize with people in trouble, but to take joy in their success requires some one bigger than I.

—Elbert Hubbard.

"THE LIAR."

On June 23d President Arthur T. Hadley of Yale, preached a baccalaureate address on "The Liar."

He made a plea for the sort of honesty that satisfies the inner consciousness and safeguards absolutely the man's future. He said that it was demanded in the social and business dealings of the day that one must be not only passively, but aggressively, honest.

"It may be true that honesty is the best policy," he said, "but it is undeniably true that nobody was ever really honest if that was his reason."

Dr. Hadley said in part:

"I plead to-day for a view of cleanliness and straightness which shall protect us from the subtler forms of evil no less than the obvious ones; for an interpretation which shall concern itself not with external forms, however important, but with a man's inward spirit. I plead for a purity and a truthfulness which shall be positive, not negative; militant, not defensive.

"We have inherited from our fathers certain rules of conduct which are explicit and easy to understand. We are told that we must keep our hands clean, physically and morally; that we must avoid lying and cheating, and all the more obvious forms of deceit which when found out would bring us penalty. These rules are supported by the sanction of social conventions and usage. A character and a life based upon these rules is buttressed by all the artificial advantages which society gives. Small wonder, then, that many a man is tempted to rest content with this intelligible and practical system of morals, and to set aside as a mere dream any religion or any standard of honor which seems to demand more than this.

"And yet a man who chooses this philosophy of life or this standard of character makes a hopeless mistake. The most dangerous evils are not the ones which are consciously met and defeated by a system of rules. It is the unseen attacks that do the mischief.

"To the man of strong feelings and passions the only real safeguard for chastity is an habitual and instinctive shrinking from personal contact with what is common. To the man who is ambitious of business or professional success the only sure guard against dishonor is an instinctive and unaccountable reluctance to do anything which he will have to explain to his own conscience.

"To the man whose dangers lie in the direction of discouragement or pessimism the best support is a refusal to repeat unproved scandals and an essential unwillingness to believe evil of his neighbors. For with these safeguards the evil is crushed in its inception, and without them every step is one of peril. If a man has no better guide than the statutes and conventions of those about him, he is safe from neither personal nor professional dishonor.

"When a man tells a lie it means that some consideration, usually a selfish one, has got so prominently into the foreground that he is willing to violate certain rules which have been recognized as the foundation of all good business dealing. He rates the advantage which is immediately before him high, and rates the honor of keeping his word low.

"What sort of unselfish considerations there may be which in extreme instances justify a man in departing from verbal truthfulness I do not care to discuss. We all recognize that no man is worthy of our tolerance who departs from the truth for selfish reasons, or who habitually neglects it for any reasons whatever.

"The integrity of the spoken word is a necessity among a people which desire to get its business efficiently and straightforwardly done. It is impossible to get the complex needs of modern life satisfied, or the complex forces of society ruled unless the business men and the political leaders keep their word to one another. Therefore any man who is found to be physically untruthful is first distrusted and then cast out, just as completely as we distrust and cast out the man who is physically uncleanly. The reason is nearly the same in the two cases.

"It is a measure of self-protection on the part of society. And the reason is so obvious and so imperative that it is only a very weak or a very foolish man who shuts his eyes to it and persists in a course of conduct which must result either in peril to society or in ostracism to himself."

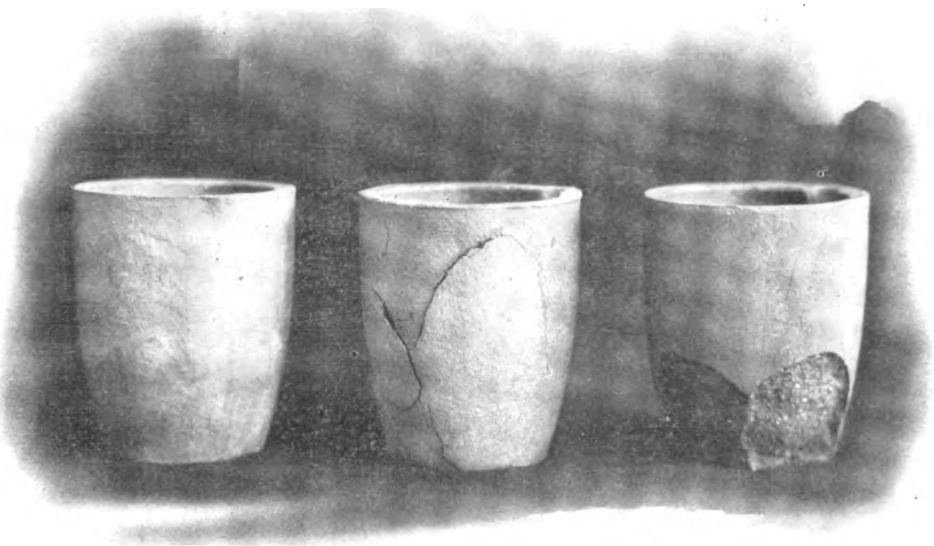
COAL OUTPUT OF THE UNITED STATES.

According to statistics compiled for the United States geological survey by Edward W. Parker, the total production of coal in the United States in 1906 was 414,039,581 short tons of 2,000 pounds, valued at $512,610,744.

Compared with 1905, these figures show an increase of 21,120,240 short tons in quantity, and of $35,853,781 in value.

Of this total production Pennsylvania contributed 200,546,084 short tons, valued at $262,182,935.

The anthracite production of Pennsylvania in 1906 was 63,645,010 long tons, valued at $131,917,694. West Virginia has supplanted Illinois as the second coal-producing state.



A B C

ANNEALING OF CRUCIBLES.

Proper and Improper.

Among the various complaints registered against the crucible manufacturer, there are two that are most exasperating. One is what is commonly known as a "scalp," and the other is usually referred to as "pin-holes." They belong to the same family, the only difference being that the one is more exaggerated than the other.

In order to illustrate this we herewith produce a cut showing three crucibles which might bear the relationship of triplets. They were born at the same time, made from the same formula, dried in a natural way side by side, and burned together in the same kiln. They are exactly alike when started out for service.

Fig. *C* on its journey to Mr. Brown's foundry meets with a spell of wet weather, it absorbs an excessive amount of moisture. Mr. Brown's melter does not notice or consider the abnormal weather conditions; he proceeds to anneal "just the same as we always have done," and places the crucible on a very hot muffle. The heat is too sudden to dispel the moisture according to natural laws, the moisture becomes steam, then the explosion.

Fig. *B* is started in another direction and finds its way into Smith's foundry. The weather conditions may have been a little more favorable, and Smith's melter may have used a little more discretion in placing it on the muffle, or, the muffle may not have been quite so hot, but that not enough discretion was used is shown in the cut. The explosion was not as complete as in the case of Fig. *C*, but enough to show that the natural laws had again been disobeyed.

Fig. *A* happens to drop off in the Jones foundry. The weather is fine and conditions normal. The crucible contains moisture, but no more than ordinary. It, like its brothers, has to pass through the annealing process, and, although it was treated just the same, went on the same hot muffle, received the same sudden heat, it to all appearance is perfectly sound.

It is charged and put in the furnace. One, two, three and possibly seven or eight heats have been run off when all at once a little stream of metal is seen to ooze from its side. The pot is taken from the fire, metal removed and allowed to cool. We examine it and find the walls nearly as thick as at the start. The crucible has glazed nicely and there seems no reason why it should develop a weakness at this one particular point.

We break the crucible at this spot, and there woven in the wall we find a thin sheet of metal. The crucible has sustained an internal rupture in its annealing, or in other words, a small fissure has been formed, and it required a few heats for the hot metal to work its way into this fissure and a few more to work its way to the outside.

The cause that produced the effect in Fig. *A* was the same cause that produced the effect in Fig. *C*, but in a less aggravated form, yet the ultimate result was more disastrous to the user.

The crucible manufacturer gets a letter from Brown, Smith, and Jones. Brown and Smith both write that "the pots broke before we put them in the fire," while Jones contents himself by saying "they only run seven or eight heats and I usually get thirty from your shipments."

There is one paragraph in all three letters that is invariably synonymous, it is this, "we handled these crucibles just the same way we have handled them for years." "Handled them the same way, etc.," is exactly what should not be done unless it is worked from the safe extreme.

There can be no fixed rule to govern the annealing of crucibles as conditions differ, but whatever the conditions, there are four points that *must* be strictly adhered to:

First: The temperature must go above 250 degrees Fahrenheit.

Second: This temperature should be reached gradually.

Third: This temperature must be held a sufficient time to allow the moisture to thoroughly disappear.

Fourth: The crucible must go in the crucible furnace with a temperature above 250 degrees Fahrenheit.

Fortunately these troubles are not general, and as a rule confined to small shops. Large consumers of curcibles have educated themselves along these lines and fitted themselves with proper annealing ovens, with the result that crucible troubles are eliminated.

Crucibles, when burned in the maker's kiln, reach a heat little below the melting-point of brass, but the maker cannot be held for the moisture it absorbs after it leaves his hands, or, in fact while it is in his hands, for it will readily accept moisture anywhere, and the riddance of which is simply up to the melter every time. Nature has her fixed laws, if they are violated a penalty is exacted.

THE "ETERNO"

FOR VACATION WRITING

You will want to send a few souvenir cards to your friends when away this year, nearly everybody does. For such writing nothing equals the convenience of Dixon's Eterno, the indelible pencil. Perhaps you are familiar with the kind of indelible pencil that writes an ugly purple—Dixon's Eterno writes practically black.

The advantages of Dixon's Eterno pencil over a fountain pen are many. It never leaks or spills, spoiling the clothing. It never runs dry at an inopportune moment. If it should get lost—and in the abandon of vacation enjoyment this is very possible—it is cheaply replaced.

Dixon's Eterno can be bought with a nickeled cap that protects the point. Take a supply on your vacation.

We've a little circular that tells how, when, where, and why you should use Dixon's Eterno—we will send you a free copy on request.

Joseph Dixon Crucible Company,

JERSEY CITY, N. J.

Graphite

VOL. XI. SEPTEMBER, 1907. No. 9.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

AN ENGINEER'S TESTIMONY.

I wish to say a few words, from my own knowledge, on the cause of railway wrecks, so frequent a subject of newspaper comment in these days. For most of the recent wrecks there are two or three causes given: danger signals passed, brakes failing to hold, or signals not displayed. Now, we all know that the safety of a great train depends upon the engineer up front. But probably few of us really understand the details of his responsibility. Hundreds of lights, signals, etc., glide by, each one having a different color, each with a distinct meaning, and the false reading of one passed in a fraction of a second may mean death or destruction for all. But the time must be made; the water in the boiler must be kept at a certain height; the engineer must watch his steam-gage, his air-gage, his car-heater, and he must watch the precious little pint of oil that he has in his lubricator, so that not one drop shall be wasted. (Only one pint of oil is generally allowed to valves and cylinders on locomotive on 100-mile runs). He must look at his watch, his timetable, read his orders, etc. In order to see them, he must stand upon his seat or other convenient place to get the light from a small lamp 'way up on top of the boiler, generally five or six feet away. While he is doing all this, who is watching the signals ahead? The fireman has all he can do to shovel coal, etc. Indeed, on some classes of engines of the Mother Hubbard type, the engineer cannot see the fireman at all, and could not speak to him if he tried. There are supposed to be speaking-tubes between the fireman's cab and the engineer's cab on such engines, but a thorough investigation would reveal that if there are any, they are in no shape to be used.

When the wreck at Westfield, N. J., occurred, a year or two ago, what was the cause? Running by danger signals, true. But the dying statement of the engineer was that he could not get his injector to work and that the steam from it blinded him so that he could not see. Yet there is no more reliable piece of machinery made when it is kept in proper working order. How about the responsibility of machinists who do not do their work thoroughly when the engine is in for repairs?

Another thing, I can prove that the automatic block signal sometimes does not work, as I have passed them myself when they showed clear track ahead, and have found a train in the block ahead. I admit that this is not often the case, but there are times when such things do happen. And since the automatic signals are used, the flagman makes no effort to protect the rear of his train at all. The surprise business of setting signals to catch engineers is good as far as it goes, but why not go a little farther and surprise some of the flagmen who do not even pretend to do what they are paid for? I know of railroads that pay $30 every six months as reward to all flagmen who do not have their rear struck, or who are not reported for not flagging. If these men were watched closely on the road for thirty days, money would be saved in the next six months, and afterward a much more efficient force might be created than there is at the present time. There are a good many other things that I could call attention to; locomotive injectors placed in such positions that engineers cannot reach them and keep a lookout on track and signals at the same time; train crews on freight trains kept on duty from twenty to thirty hours without rest; train crews asleep in caboose while train is running (much more prevalent than generally known, especially at night), etc.

—A LOCOMOTIVE ENGINEER in *Everybody's Magazine.*

AS TO LUBRICANTS.

Say "lubricant" to many people and all they can think of is grease or machine oil. Some people will even deny that graphite is a lubricant because it is neither grease nor oil, and we therefore wish to point out in a word the scope of this word "*lubricant.*" Our dictionaries define the word lubricant as "anything which lubricates," that is anything which lowers friction, and it will at once appear how many different substances there are which serve to lower friction in different situations. There is everthing from a banana skin on the sidewalk in Summer time to the ice on the top step of the front stoop in Winter. There is everything from the wax on the dancing floor to the cheapest "dope" smeared on the sides of the ferry slip, every one of them lubricates just as truly as cylinder oil or grease, for they all reduce friction. Graphite is a lubricant because it is successfully used to reduce friction and every writer of any note upon lubrication classes graphite among true lubricants.

AN IRISHMAN was shown through a jail. After he had made the trip, he was asked what he thought of the place. "Oh," said he, "there's one place I like here and that's the intrence out."

ESTABLISHED 1827. INCORPORATED 1868.

D X N
TRADE MARK

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Black Lead.

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MICHIGAN GRAPHITE.

"Graphite, an allotropic form of carbon, used in making lead pencils, paints, lubricants, stove polish and numerous other products, is found throughout the iron formation of upper Michigan, usually in thin seams of impure mineral. It is also found in the granite north of the iron zone. The only two deposits that have ever been developed are in Baraga county, at the west end of the Marquette iron range. Both of these are in the hands of Detroit people. The Baraga county beds are of unusual width and are mined economically after the surface overburden is stripped. Graphite is found at a number of points on the Menominee iron range, but no extensive seams have yet been discovered. A considerable body of the mineral was found in 1884 near Humboldt, in Marquette county, but except for a little work by Milwaukee people it has been neglected."—*Mining World*, July 13, 1907.

The above clipping from the *Mining World* has been sent us and our opinion has been asked concerning same. Personally we have no knowledge of the Michigan graphite mines further than that we have never seen any samples of graphite from Michigan that were of any value so far as the Dixon products are concerned. The following from *The Engineering and Mining Journal* of New York, under date of January 1, 1898, may be of interest: "There was produced in Baraga County, Michigan, 100 tons in 1896, and 600 tons in 1897, of a carbonaceous material, which is ground for paint and is improperly called graphite. It is simply a carbonaceous schist extending over several thousands of acres, without sign of any vein of graphite. The quarry is situated in Sec. 33, T. 50 N. R. 33 W."

In all probability this is the material the *Mining World* refers to.

TEMPERING AND LUBRICATING REAMERS.

The inherent depravity of the taper fluted reamer is so well known that special mention is not needed. Its tricks and vagaries are sought to be overcome by all sorts of expedients. It chokes and jerks out a piece of itself, or it refuses to cut, or it chatters, or sticks fast. Engine oil does no good, and lard oil is substituted, still it doesn't behave well. It is ground to a different angle, or it is made with an odd number of flutes, or they are irregularly spaced, and after all it is about as bad as ever. Sometimes they are fluted spirally with indifferent result. It will either feed itself too fast, or it will require force to make it cut, and all that.

The "slickest" lubricant I have ever used and the one that cures all the ills that reamers are heir to is tallow and flake graphite thoroughly mixed. It is a sensuous delight to use a good reamer thus lubricated. Any old, out of round, hand ground reamer works smoothly, and one wonders why someone didn't say so before.

Speaking of reamers, it is in order to say the only way to harden a long reamer without warping is to suspend the reamer and tongs by a string twisted tight and when the reamer is heated properly, hold it over the tub suspended perpendicularly by the string in one hand, holding it from turning with the other. When you are all ready let go and allow it to revolve rapidly and dip at the same instant. Reamers or taps or any tool hardened this way will be practically straight. This is a new trick and a good one.

—C. W. CRAWFORD in *American Machinist*.

FUN WITH UNCLE SAM.

The Peerless Machinery Company, of Boston, sends an order to the Dixon branch office in Boston correctly addressed as follows:

"JOSEPH DIXON CRUCIBLE CO.,
No. 101 Tremont St.,
City."

The Boston postmaster makes a slip-up somewhere in his system and the envelop brings up at our Chicago branch and is sent to Dixon at Jersey City. The envelope bearing the following endorsements.

"The only Dixon Uncle Sam knows is in Chicago."

"Where is Boston? Seems familiar."

DIXON'S graphite publications sent free upon request.

PRESSURE REDUCING VALVES.

By Wm. H. Wakeman.

Chapter IV.

(Concluded.)

Fig. 24 illustrates another valve controlled by a diaphragm and a spring, but it is made in all sizes liable to be wanted for ordinary service. All of the larger sizes of such valves are made with flanged ends, and this feature is shown here plainly for the purpose of illustrating two ways of packing such flanges.

One of these is to cut a gasket with a hole in it, large enough to give full capacity of the flange, or about one-quarter of an inch larger, so that when it is clamped between the flanges enough to force some of it inward, it will not reduce the opening at this point. More than one case is on record where packing has been put in such a place without a hole of any kind in the center of it. This is a dangerous oversight, especially in a case where there is a pressure on both sides of the packing, because under such conditions it may sustain a very high pressure on the boiler side until serious results are possible, as it is supported by the lighter pressure.

For illustration of this point suppose that when a tough kind of packing is used for a gasket on a three inch flange, and a hole is not cut in the center of it, such a gasket will

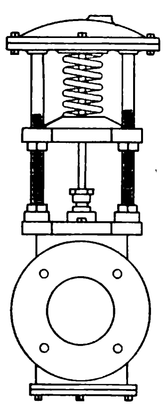


Fig. 24.

withstand fifty pounds pressure for a short time. If the pipe on which it is located discharges into a main carrying 100 pounds, there may be 150 pounds on the boiler side, because the gasket is only required to support the difference between the two pressures.

The outer diameter is only large enough to come within the four bolt holes shown. The advantage of this plan is that only a comparatively small surface is exposed to clamping pressure exerted by the bolts, therefore the pressure per square inch is high, insuring its safety from blowing out under high steam pressure. The disadvantage is that it is extremely difficult to get it together properly, and to know that the gasket is in just the right place. When screwing on the nuts the tendency is to make the first one too tight, thus canting the flanges out of their proper position, then it is not possible to secure equal compression on the remainder of the flange, consequently it either leaks when steam is first turned on, or else it blows out some time afterward. To prevent this trouble care should be taken to give all nuts an even tension, and when this is done the open space around the edges of the flanges will be practically the same at all points.

The other way to pack such a joint is to cut a gasket the full diameter of the flanges (taking care to remove the center), and put it into place. The advantages of this plan are that it is easy to get the gasket into place, and it is not difficult to know that it is right because it will be even with the edges of the flanges at all points. It is almost impossible to make a mistake when putting in the bolts and tightening the nuts, as the flanges cannot be forced out of place enough to cause trouble.

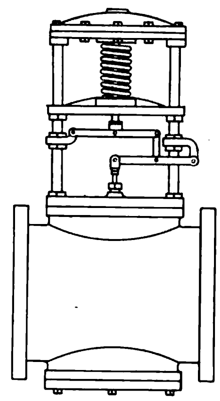


Fig. 25.

The disadvantage of it is that as the surface in contact is large the clamping pressure per square inch is low, consequently there is danger of it blowing out when this point alone is considered, but every square inch of it cleaves tightly to the metal, provided Dixon's Graphite is not spread on them before they are packed, hence there is little real danger of failure from this cause, and it is sometimes difficult to pry them apart when a valve is to be removed for any cause.

The opinions of engineers and steam users seem to differ concerning the proper size of the holes in the packing to admit bolts, as some mark them and cut out enough metal to make holes larger than the bolts, while others do not cut holes at all but drive the bolts through after the gasket is put in position. Probably the best way is to make holes large enough for bolts to go through easily, as the packing will naturally close in to the bolts when heated by steam.

Furthermore, the joint should be made between the flanges,

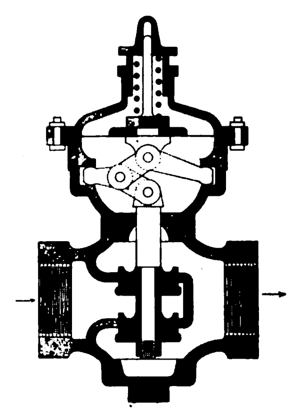


Fig. 26.

thus keeping steam entirely away from the bolts. The practise of driving bolts through packing is simply barbarous, and ought to be discontinued. Packing may be laid on one of the flanges and cut by hammering on the edges and in the bolt holes if desired, as a gasket can be cut quickly in this way.

While Fig. 25 is fitted with two levers, it is not a lever valve in the ordinary sense of the word, as the reduced pressure is controlled by a spring as in previous cases. There are numerous cases in which steam is not drawn steadily through a valve, but the quantity required is constantly changing. This causes pulsation of the valve, unless means are provided for overcoming the same. The levers shown in the illustration answer this purpose, as a study of their operation shows that for a given movement of the diaphragm center, the valve stem will travel much farther than where

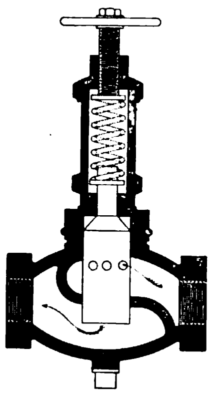


FIG 27.

the valve is direct connected, hence it follows as a natural consequence that a given movement of the valve stem, necessary to control the pressure, is secured by a correspondingly short travel of the diaphragm, consequently the latter proves very durable, and pulsation of the valve is reduced to the lowest possible amount.

Fig. 26 is another valve in which compound levers are used, giving a long travel of the valve stem for a short movement of the diaphragm, and the whole mechanism is enclosed in a cast iron case. This valve has a very wide range of operation, as it will take any pressure not exceeding 200 pounds and reduce it to one pound if required, or the reduced pressure may be as high as 100 pounds, provided the inlet pressure is high enough to provide it. A metal diaphragm is used, and as its movement is very short owing to the compound levers, it proves very satisfactory in service.

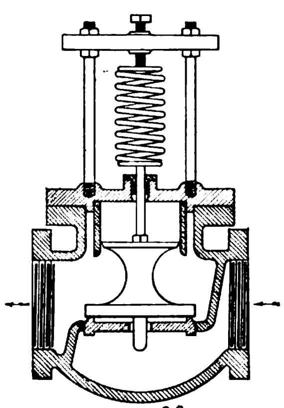


FIG. 28.

Fig. 27 is a very compact and self-contained valve in which no diaphragm is used, consequently no secondary connection is required. Steam coming from the high pressure side passes through passages in the body of the valve as shown, and comes out through the bottom of it, going into the low pressure system. When pressure in the outlet side reaches the point at which the spring is set by the hand wheel it acts on the body of the valve, moving it upward and throttling or even shutting off the supply. These valves are used on railroad trains and steam vessels, where a lever valve could not be tolerated, as the rolling and vibrating motion does not affect their operation; but they can, of course, be used on stationary work. They will reduce 200 pounds to 25 or more as wanted. The largest regular size made is for six inch-pipe.

Fig. 28 is for use where water pressure in the street mains is very high, and it is desired to reduce it in the buildings where it is used to various pressures. It is an unbalanced valve of the globe type, which has already been explained, consequently it will shut off tight when the service demands it. The operation is controlled by an external spring that is always accessible.

(To be continued.)

JERSEY CITY SEES END OF GLIDDEN TOUR.

Jersey City, the home of the Joseph Dixon Crucible Company, had the distinction of seeing the end of the Glidden Tour, the entrants checking out at the city hall. Possibly it may have had the further distinction of seeing the last of the last Glidden Tour, for some are of the opinion that no more will be held.

The Horseless Age in this connection says·

"A meteoric existence seems to be the common fate of all big annual automobile events. The Gordon Bennett or International Cup Race began in a modest way, then suddenly attained a world wide prominence, but just as suddenly disappeared from the scene entirely. The Tourist Trophy Race in Great Britain marked a new departure in automobile competitive events when first organized and was an immediate success, but the number of competitors has been decreasing each year, and it is now the almost general opinion, as expressed in the British automobile press, that either the whole character of the event must be changed or else it will cease to be run. The Glidden Tour as an event was on the ascendency up to last year, but the adverse decision of the Manufacturers' Association and probably the failure of the organizers to so draft the rules that undue speeding is of no advantage to the competitors in any case bid fair to eliminate it also from the list of annual automobile fixtures."

Both cars and tourists showed stains of travel, but, barring the mud and grime, did not appear to have suffered in consequence. In fact, the "vigorous health" of the cars, which was indicated by their speed, easy control, and quick response, suggested that Dixon's Graphite Motor Lubricants had been used to lighten the journey's strain.

OUR SCIENTIFIC friends have lately been studying Indian myths, one of which is that the first woman was a deer. One of our young men when he heard that, remarked that he did not see anything strange in that as the young lady that wears his engagement ring is certainly a dear.

IT IS SAID that there are forty-six offices of foreign consuls in New York city.

GEORGE T. SMITH,

Vice President Joseph Dixon Crucible Company.

Mr. George T. Smith has been actively connected with the Joseph Dixon Crucible Company for several years as Director, and on May 31st was duly elected by the Board of Directors to succeed Vice President Walker, whose death occurred May 23d.

As the readers of GRAPHITE have from time to time been treated to a phrenological reading of the different members of the Dixon Company, we shall, as it were, initiate and introduce Mr. Smith to our readers in the same fashion.

For this reading we are indebted to the well-known firm of Fowler & Wells of New York City, and we are pleased to say that the measurements taken by these well-known phrenologists, handicapped though they were by being in possession of only a photograph and not knowing the man nor his position, fully coincide with the opinions of those of us who know Mr. Smith so well. The reading is as follows:

This gentleman has an exceptional organization in several respects, and he should be known for his high degree of mental culture, exquisite taste concerning the harmony of things, and his keen appreciation for those subjects that deal with humanity on a large scale.

It is easy to see that his head is unusually high from the middle of the forehead upward, and the conclusion that he lives in the superior part of his brain is not an unreasonable one.

He blends his thoughtfulness for others, kindness of disposition, and generosity of feeling with his stronger, sterner, more inflexible faculties. Thus he is neither weak through the one, nor stern from the other source, as a man would be if he were biased by having one kind of attribute only. He should therefore be tolerant to his enemies (if he has any), and firm, self-reliant, and conscientious when dealing with his friends. Most men are just the opposite—intolerant with their enemies, and weak when dealing with their friends.

For this reason, we say he is an exceptional man.

We can see, too, that he has large Human Nature, and is very intuitive; quickly grasps the force of a person's ability, and sums him up at first sight. He is what some people call "level-headed," but he is level-headed as well as high-headed.

He is a man who will always get the highest percentage of good work that is obtainable from his employees. If a man cannot come up to his ideal he does not want him in his employ, but he is very particular whom he engages at the outset. He wants his work to look as perfect as it is possible, and will strain a point to get it finely executed.

As a young man, he could have excelled as a bookkeeper, secretary, manager, and then superintendent of an important line of work where responsibility was required, foresight called for, and integrity one of the chief requirements in the work. Everyone will respect his judgment, for although he is very firm and tenacious, he is able to carry reason and philosophy into his arguments, and generally wins out, where an impulsive man would lose all his game before he fired a single shot.

Had he not sound jugdment, his benevolence would sometime lead him astray; but his Conscientiousness, Firmness, and Causality all help to give direction to his mind and add poise and dignity to his character.

He would make a good president of some large invested capital or stock company, where the interests of others were involved, for it will be noticed that his head is broader half way up its ascent than at the base.

He should also display good judgment in selecting material and stock; and further, should know how to invest money appropriately.

In short, he is a clear-sighted, intuitive, sympathetic, ingenious, conscientious, analytical man, and should be much respected by his fellow citizens wherever he may reside, and will be called upon to fill some office of importance and trust in a business, in a church, and in municipal matters.

POWER TRANSMISSION BY MANILA FIBRE ROPE.

In June GRAPHITE an article was reproduced from the *Engineer*, April 1, 1907, under the title of "Lubrication of Transmission Rope."

As mention was made of cotton ropes, when the article really should have referred primarily and emphatically to the lubrication of manila ropes, and as American transmission rope contains no cotton, but is made of long fibre manila hemp, and as some further criticism has been made of that article, we asked Mr. George P. Hutchins, a very well known writer in the mechanical field, to prepare an article for the columns of GRAPHITE, and this he has carefully done. Elsewhere in this number will be found the opening chapter, and the article will probably run through three consecutive numbers of GRAPHITE.

All readers of GRAPHITE who are in any way interested in power transmission, will find Mr. Hutchins' article not only entertaining and instructive reading, but probably one which they may be able to profit by.

COMING TO IT.

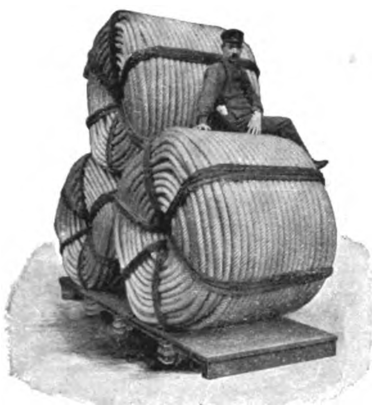
"One or two automobile manufacturers in France have made a specialty of supplying grease mixed with graphite, which is one of the best lubricants, even in a virtually solid form, so that if the grease melts away particles of the graphite still remain between the bearing surfaces, and prevent excessive friction and wear."—*The Motor Way.*

As the Joseph Dixon Crucible Company have an agency established in France we think it fair to believe that it is Dixon's Graphite Grease that is referred to.

POWER TRANSMISSION BY MANILA FIBRE ROPE.

By George P. Hutchins.

Chapter I.



Because mankind has known rope from the times first recorded, and because it is an article of such common, universal usage, few people among the many who are daily seeing, reading about, or working around rope power transmissions realize that this use of rope in its present large extent is one of the most recent developments of modern engineering. It is only within the last fifteen years that rope drives have given promise of being generally recognized as a convenient and efficient means of accomplishing the ends for which they were designed.

One of the most important contributary causes for late acceptance by the engineering world of this cheap and ready servant, which is so simple that its use must often have suggested itself to many power handlers, was the lack of reliable and sufficiently flexible rope of reasonable endurance. It would be difficult to conceive of modern steam engineering if cylinders had to be hollowed out, and tried and smoothed with hammer, chisel and file, as they did before the development of lathe and boring mills. Not less essential to the general spread of rope driving was the production of high grade, scientifically-made-and-lubricated transmission rope.

Since this means has been perfected, it has displaced gearing and belting in a great number of installations. In very many cases it is used in preference to electrical power distribution, having advantages for special conditions which over-ride considerations of the extreme up-to-dateness of electrical appliances.

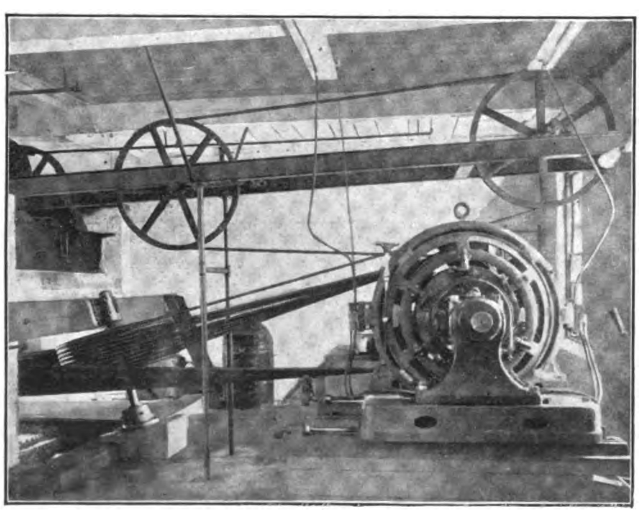


Fig. 1.

Wherever rope has been tried and not found satisfactory, investigation invariably shows absence of suitable conditions of design and construction. No one instrument can be successfully used for all kinds of work. For instance, few of the many "universal tools" are anything more than soul-trying time-wasters. There are conditions for which rope power transmission is wholly unsuited; there are others, such as the quarter turn drive shown in Fig. 1, in which the "continuous" system answers perfectly, while the "multiple" system would be quite inapplicable.

In speaking of rope transmission generally, it is well to recall that by common acceptance the term is confined to transmission by means of rope made from a pliant, woven or plaited material of a non-metallic and more specifically of a vegetable nature. Where iron or steel wire is used to make the rope, the system is generally designated as wire rope transmission. The reason for this peculiar and interesting distinction in terminology is to be sought in the popular appreciation of the fact that wire rope is a misnomer, as in all but the very small diameters it partakes more of the nature of an iron bar than of the relatively soft, flexible, light, resilient fabric identified with the word "rope."

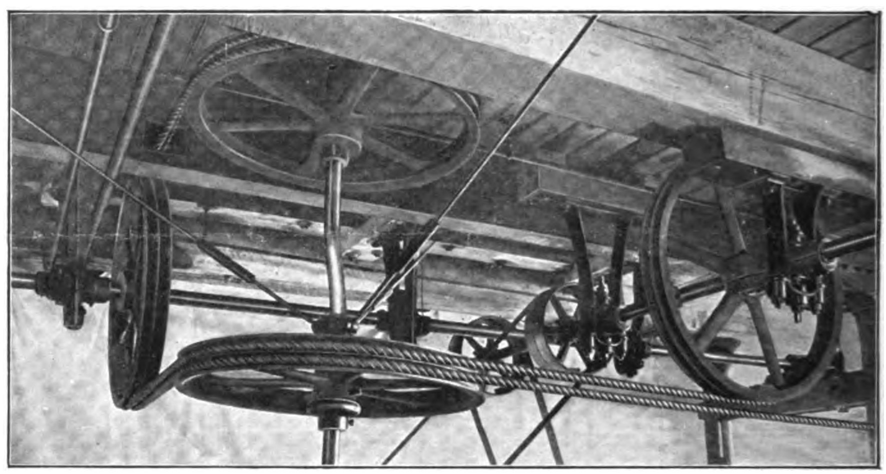


Fig. 2.

To enumerate individually *all* the advantages of rope transmission would remind one of reciting all the titles of the Shah of Persia. In general terms it may be safely said that where the distance between driving and driven shafts is not less than 10 nor more than 1200 feet, fiber rope running in properly grooved sheaves, offers the cheapest, safest, most efficient, and most economical means of power transmission known to engineering. When shafts are not parallel, rope drive is unexcelled by any other form of connection.

No matter at what angle the driver may stand to the driven shaft, power will be delivered at minimum loss and with greatest certainty. Compare the combination often seen of clattering skew, bevel and worm-wheels with their heavy tolls of friction, cost of lubrication, and attendance, and increased liability to breakdown at each step, with the simplicity and absolute reliability of the noiseless rope transmission method of solving the problem presented by the shafts shown in Fig. 2. In this case 40 H. P. is transmitted between shafts at right angles, the ropes running through a

6″ square hole cut through a steel I-beam. This drive runs so noiselessly as to be scarcely audible when standing directly underneath the sheaves. Fig. 3 shows an over-roof drive between separated buildings, transmitting about 80 H. P. around corners and at angles quite impossible to any other

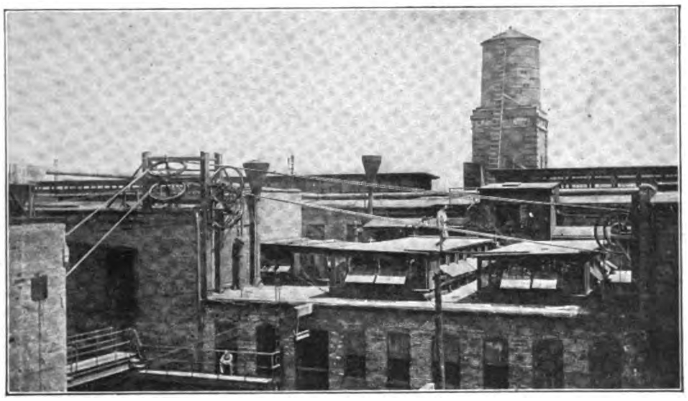


FIG. 3.

known form of drive. When shafts are even slightly out of alignment, the wear and noisy pound on any form of link connection are prohibitive. Belts under such circumstances cannot be kept on their pulleys. Rope, however, owing to its flexibility and uniform figure of contact, can adjust itself to new positions in the sheave grooves, thus permitting a considerable degree of eccentricity without derangement of service.

(To be continued.)

CARRYING A PENCIL.

A Protest and a Parody.

A clever and witty paragraph from the *New York Press* "touching on and pertaining to" the alleged fact that "you can push a pen but a pencil must be lead," which was printed in July GRAPHITE, brings a fitting retort from Mr. J. W. Cady, of Hardy & Cady, the well known architects of Chicago. Mr. Cady says: "I don't care especially for the *New York Press'* attitude in the matter of carrying pencils; hence the kick."

"It is likely that every draftsman in Chicago, not over a hundred years old (both of them) borrows a pencil on occasion. If so, he ought to swipe it, because a pencil if driven, must be lead, to speak after the manner of paradoxes. Once stolen, the pencil should be added to its hundreds of predecessors and carried point down, like all the rest. Thus several dollars worth of pencils in one twenty cent pocket, with no repairs needed to it, nor for the hide that has been barked by a sharp point, nor for one's morals, temper, and reputation.

"A well-sharpened pencil will make one very small hole in one ordinary pocket in about eleven months and six hours, and not even a small hole in the skin. Down with the point—in fact, à bas le point! Let us reform this pencil business by reforming it.

" Yours graphitically,
(Signed) J. W. CADY."

AUGUST "GRAPHITE" APPRECIATED.

Atlantic City, the nation's play ground and health resort, has a world-wide reputation which has largely been gained through the publicity given the advantages of the unrivalled city by the sea.

The publicity and care of visitors are in the hands of one of the most progressive Citizens' Associations in the world, which is known as the Atlantic City Hotel Men's Association.

The Atlantic City Hotel Men's Association was organized two years ago, and since that time they have brought more large conventions to Atlantic City than ever before in the history of that popular resort.

The success of the Master Car Builders' and Master Mechanics' Associations' Convention, in June, is largely due to the excellent co-operation of the Atlantic City Hotel Men's Association with the Supply Men's Association of the Master Mechanics' Association.

August GRAPHITE illustrated and described this particular convention, and we have the following words of appreciation of our publication from Mr. A. T. Bell, President of the Atlantic City Hotel Men's Association.

Atlantic City, July 30, 1907.

Joseph Dixon Crucible Company,
Jersey City, N. J.

Gentlemen:—

I write to thank you for the several copies of GRAPHITE just received, containing pictures and articles upon your recent conventions at Atlantic City. The printed matter and cuts are both excellent and reflect great credit upon your company for its enterprise in publishing such an interesting journal and in giving a good account of such an important meeting. We are glad to see Atlantic City spoken of so favorably and appreciate very much your kindly feelings.

With pleasant recollections of your visit, and the hope that you will be here again in 1908, we are,

Yours very truly,
ATLANTIC CITY HOTEL MEN'S ASSOCIATION,
A. T. Bell, President.

DIXON'S CRUCIBLES AVERAGE 38 HEATS.

It has been truly said that the best testimonial is a check for the old bill and an order for a duplicate lot.

In the present instance we have received the check and the order for the duplicate lot, and in addition we quote the following extract from a letter received from The Wm. Powell Co., Cincinnati.

"Enclosed please find memo. of heats taken from seven No. 60 pots Dixon make. These were from the lot of 50 received March 6th. Our foundry foreman says he considers this one of the best records of which he has ever known."

Since this letter was written the Powell Company have used up the balance of the crucibles and find the average still keeps up. The lowest number of heats any crucible gave was 35 and the highest 40. The average was 38 heats.

Then glory to the steel
That shines in the reaper's hand;
And thanks to God who has blessed the sod,
And crowns the harvest land!—ELIZA COOK.

A WORD TO THE WISE.

A Promient Manufacturing Concern.—A Prominent Consulting Engineer —A Prominent Protective Paint.

Three prominent concerns were brought together in business relations three years ago, through the specifications of the prominent Consulting Engineer providing for the use of Dixon's Silica-Graphite Paint to protect the structural steel work of two large foundry buildings for one of America's greatest industrial companies.

The two steel buildings were properly erected and properly painted with two coats of Dixon's Silica-Graphite Paint. At the completion of the steel work of the buildings, it was decided not to finish the structures until the summer of 1907; these buildings are at this time being enclosed.

In the intervening three years, the steel work has been fully exposed to the destructive rust-producing agencies; heat of the summer's sun; moisture of the winter's storms, and sulphurous gases of the railroads and factories near by.

The prominent Consulting Engineer recently examined the steel work before allowing the masons to enclose it with building materials, and he reported to the manufacturing concern that Dixon's Silica-Graphite Paint had so perfectly prevented corrosion of the metal that it would only be necessary to purchase ten gallons of Dixon's Silica-Graphite Paint to touch up certain columns at points near the base, where the paint had suffered from mechanical abrasions.

The Industrial Company were well pleased with the retention of the maximum strength of their steel work, and the fact that they would not have the expense of labor and material in cleaning and repainting the buildings.

The Industrial Company is pleased with Dixon's Silica-Graphite Paint, the Consulting Engineer is pleased, and we are pleased to learn of this clear demonstration of the protective qualities of Dixon's Silica-Graphite Paint for shop and field coating of steel work. The Consulting Engineer gained in the confidence of his clients by the economy rendered by the material specified.

If the Consulting Engineer had approved of a paint submitted by the steel contractor as "*Just as Good*" as Dixon's Silica-Graphite Paint, so as to effect a saving to the steel contractor, over the material specified and assumed in the taking of the contract, the Industrial Company would unquestionably have suffered loss in the strength of the steel work; also in the cost of cleaning the rust that would have occurred, through the class of paint selected for use by the contractor, to secure his personal profit, and the additional cost to the Industrial Company of the expense of labor and paint for the repainting of the two buildings.

The Consulting Engineer was employed by the industrial company, and not by the contractor, and he protected his employers' interest by insisting upon the proper use of Dixon's Silica-Graphite Paint, as specified.

In times past architects and engineers avoided specifying building materials by names, fearing adverse criticism, but there has been a gradual movement to the better practise of creating a standard of quality, and in the modern building construction it is recognized that the architect and engineer protect the interests of their clients in specifying by "NAME" the use of building materials proven in the judgement of the specifier, "THE BEST OF THE PARTICULAR CLASS."

The class of paint to specify and use to preserve the maximum strength of structural steel work, has for years engaged the careful thought and investigation of architects and engineers. It is a noteworthy fact that the majority of architects and engineers in different cities of the world have for years specified and insisted upon the proper use of Dixon's Silica-Graphite Paint.

"STANDARD OF QUALITY," has been Dixon's policy for eighty years, and Dixon's Silica-Graphite Paint, the proven shield for steel work, has won the important place in architects' and engineers' specifications, as the standard protective coating, on its records, as the paint made in but the ONE QUALITY.

Dixon's Paint Department requests notices from architects and engineers specifying Dixon's Silica-Graphite Paint, so that contractors may be sold the quality of paint necessary to properly coat the work and inspections made from time to time to insure that the material is being properly applied for the respective coats.

HOW AN AUTO OUGHT TO BE.

Business, pleasure, rest and health,
  Recreation and a wealth
Of benefits are done up in
  A perfect auto spin.

Scale the fences! leap the trees!
  Anything to stir a breeze,
When the city is your lot
  And it's suffocating hot.

By the shady nooks and crooks,
  Through the lanes and down the brooks,
Plunge through orchard lands and then
  Hit the pike and on again.

Over hills and up the dells,
  Where the summer slumber dwells,
Rocky roads or perfect pike,
  Never mind, just hit the hike.

Never fear for break or bump,
  Pull the lever, let her jump;
Get the right kind and you'll see
  What an auto ought to be.

PLAINTIFF, AMORPHOUS GRAPHITE; DEFENDANT, FLAKE GRAPHITE.

There recently appeared in some of the technical trade papers an article on amorphous graphite in which it was stated that this form possesses lubricating advantages superior to those of flake graphite.

We, therefore, believe that the following matter, clipped from the *Iron Age* and written by an engineer of twenty-five years' experience, will interest those engaged in engineering.

GRAPHITE LUBRICATION.

By William Burns.

On page 455 of the May issue of *The Engineer* appeared an article by Mr. H. C. Woodruff, called " The Advantages of Amorphous Graphite as a Lubricant." Particular stress was laid upon the fact that amorphous graphite will stay put, and is, therefore, a superior graphite for lubricating purposes, but that flake graphite, no matter how finely ground, will not. I have used graphite as a lubricant for years, having been an engineer for twenty-five years, and therefore feel competent to point out what I have found to be the difference between flake graphite and amorphous graphite.

If one were to wet his finger in ordinary lubricating oil and then dip it into flake graphite, he would find that the graphite would attach itself to his finger, like scales upon a fish's back. If thin tissue paper is torn into fine strips and strewn on the floor it would be more difficult to sweep up than if the paper were rolled into small balls, which illustrates the action of flake graphite when used as a lubricant. No mention is made of amorphous graphite when used with oil as a lubricant, which is the form generally used for cylinder lubrication.

Amorphous graphite is washed about and doesn't get attached to the irregularities in the metal surfaces as flake graphite does, and this is best illustrated in the following manner:

If you put a thin, flat stone, illustrating in a crude way the formation of flake graphite, in a shallow stream of swiftly moving water and a round or irregular stone, illustrating the formation of amorphous graphite, the round stone will be washed down stream due to the small surface of contact, while the flat stone will catch upon the first obstruction or irregularity (and "stay put.")

The function of flake graphite is to attach itself to the minute irregularities which are known to exist in all metal surfaces and they in time will be covered with a veneer-like coating, possessing the highest lubricating qualities and, instead of having actual metallic contact, there is graphite to graphite contact, which will not happen when amorphous graphite is used, because it hasn't the adhesive qualities that the flake has.

Amorphous graphite, when used as a lubricant with ordinary oil, will invariably form paste balls due to its extreme fineness and breaking down of the particles, and it needs no elaborate discussion to point out the trouble which this will make.

A few years ago I tried some of the best amorphous graphite and oil on the crank pin of my Allis-Chalmers engine, which is lubricated by a stationary cup through a hollow ball and pipe, feeding the graphite and oil to the crank pin through the ball and pipe with a squirt gun while the engine was in motion, as I had read and heard that amorphous graphite possessed greater lubricating qualities than flake graphite, but it didn't take me long to change back. In a short time the temperature of the crank pin was much higher, and I was forced to shut down and found that the oil passage up through the center of the crank pin was completely clogged up and that paste or putty balls were formed.

I have never seen this happen with flake graphite and think that this is probably due to the fact that the flake graphite will not pack and that if there is a tendency for some to collect in the oil grooves, it will act as a sieve and that it will eventually be carried away by the oil passing through. I have noticed, however, that there was a thin layer of flake graphite formed over the channel walls.

The best means of telling which lubricant is the better is by actual test and the opinion of authorities. The following shows how the best amorphous graphite and flake graphite show up on the testing machine. These tests were made by Professor Goss of Purdue University, who is generally recognized as the foremost authority on graphite lubrication.

Professor Goss says in his own language, taken from September, '06, Graphite, page 678: " Putting the results of this test in the simplest form, it is safe to say that when the amorphous graphite is used the friction is three times as great under light loads and about twice as great under heavy loads as when flake graphite is employed. The fact that when amorphous graphite was used, the pressure could not be carried above sixty pounds without serious heating, shows clearly that the flake graphite does persistently attach itself to the frictional surfaces."

Such an eminent authority as Mr. Chas. E. Duryea, considered the foremost gas-engine designer in America, in his instruction booklet of the Duryea car, says that flake graphite should be used.

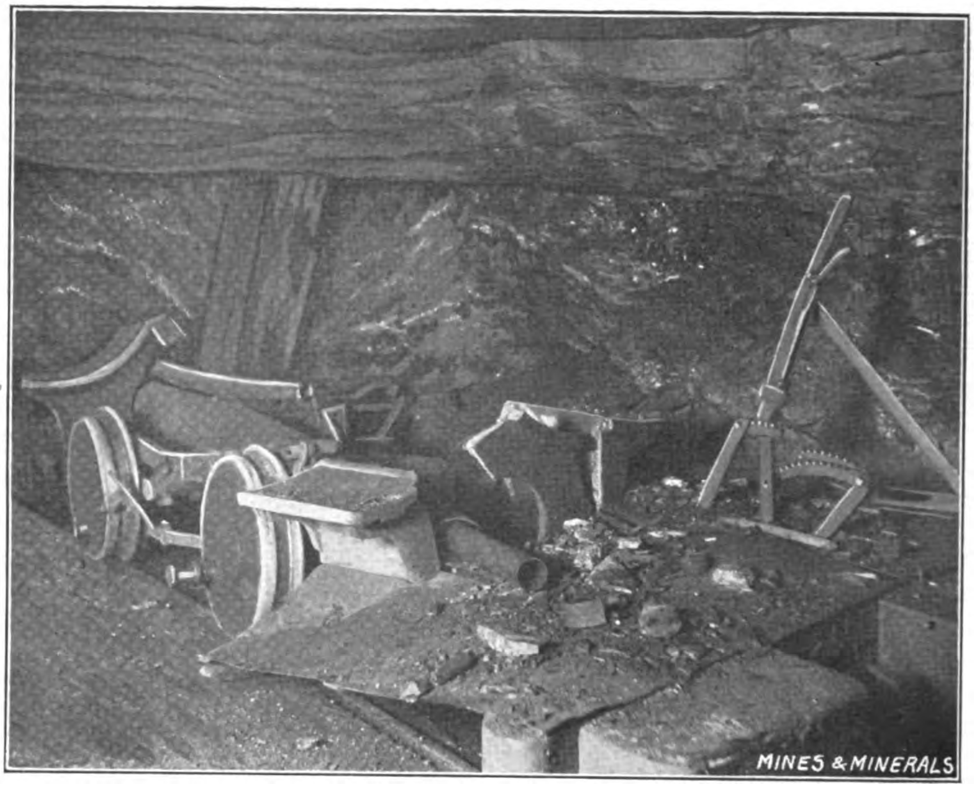
The Joseph Dixon Crucible Company, Jersey City, N. J., have prepared a number of booklets which go very deeply into the subject of lubrication and prove conclusively by facts and figures that Ticonderoga flake graphite is a superior lubricant in every way over amorphous graphite. Everyone who is interested in the subject of lubrication should have copies of "A Study in Graphite," with tests by Professor Goss, and "Graphite as a Lubricant."

A claim is made that amorphous graphite will stay suspended longer in oil than flake graphite. This statement was made, we take it, in absolute sincerity, but the graphite will partially settle, and any engineer who uses it in a lubricator certainly runs a great risk of clogging up the feed-pipes, as the specific gravity of graphite is greater than that of any oil.

There are upon the market special graphite lubricators which are so built that the lubricating oil has to pass over the graphite in going to its work, and in this manner every drop of oil carries its mite of fine flake graphite, as well as the large numbers of positive force feed lubricators.

Another fact which must not be overlooked is that amorphous graphite can be easily adulterated and not detected by the naked eye, while flake graphite can not be, as you could easily see it.

Dixon's graphite publications sent free upon request.



(Reproduced through courtesy of *Mines and Minerals.*)

ANOTHER COMPRESSED AIR RESERVOIR EXPLOSION.

On June 14, 1907, at the Number 14 Colliery of the Pennsylvania Coal Co., there occurred a very peculiar compressed air locomotive explosion. While the reservoir tanks were being recharged they exploded at a pressure of 550 pounds per square inch. Three men were killed and several severely injured. The accompanying half-tone plate from photograph shows what was left of the locomotive. Mr. Frank Richards has the following comments on pages 553 and 554 of July *Mines and Minerals* as a probable cause of this explosion:

"From the force and the disastrous results of this explosion it is evident that it was not due to the mere pressure of the air and the weakness of any part of the apparatus. It was undoubtedly due to the formation of an explosive mixture of air and oily vapor, and then a sufficient temperature at some spot to cause ignition.

"Although we have no record of an explosion quite similar to this, there is always a possibility of danger in the rapid recharging of an apparatus of this character. In this case the pressure of the air remaining in the tank was said to be 200 pounds, and this pressure was quite rapidly raised to 500 pounds. In the body of the tanks we may suppose that the incoming air mingled with that already in them with some rise of temperature, but not enough to be dangerous in itself. Any portion of the original charge, however, remaining in any pipe, passage, or pocket would not be mixed with the incoming air but would simply be compressed from the lower to the high pressure, and its temperature would be raised correspondingly, just the same as if it was compressed by a piston in a cylinder. If the temperature of the air at 200 pounds was 60 degress, its temperature at 550 pounds would be 233 degrees, which probably could hardly be considered dangerous, although approaching it.

"As the last trip was being made and the men were in a hurry to get out we may suppose that the recharging was done as rapidly as possible. The inrushing air was therefore heated by friction to a temperature not computable but evidently sufficient, in addition to the heat above stated for the compression, to cause ignition. The air in its inrush also must have traversed some passages where oil had accumulated and this vaporized and mixed with the air, and both the explosive mixture and the ignition temperature were provided for the fatal catastrophe. We may suppose that the explosion, when it came, was of a mixed character. The explosive mixture did not fill both tanks, and probably only a portion of one of them, but its ignition began the work and probably did most of the damage, the suddenly released air which was not ignited following up with its force until equilibrium was reached."

Many explosions in air-compressor reservoirs have been traced to a formation of an explosive mixture by the volatilization of cylinder oils. Our booklet, "Air Compressor Lubrication," explains fully how all dangers of this sort are removed by using Dixon's Ticonderoga Flake Graphite as a lubricant for air compressor cylinders. We would be glad to send a copy to any one interested.

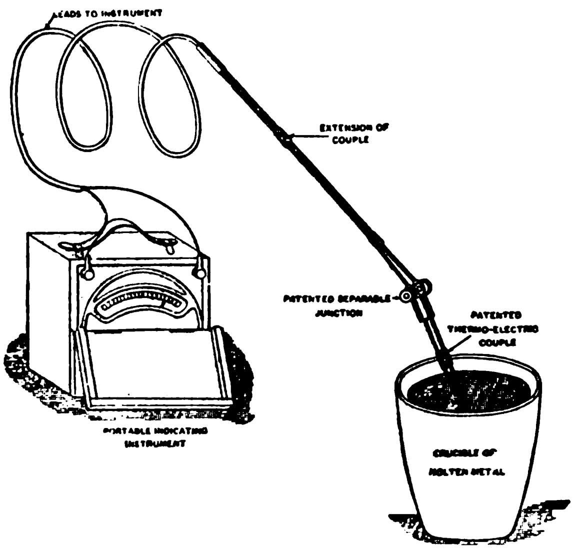
FOR THE GOOD OF AUTOMOBILES.

The efficiency and economy of a gasoline motor depends in a large measure on perfect compression. Special attention should, therefore, be paid to this point, as any leakage in piston rings, valves, plugs, packing; or porous cylinder walls directly affects the working of the engine.—*Automobile Bulletin.*

Dixon's Motor Graphite will fill all the microscopical inequalities of the cylinder walls and will prevent cutting and loss of compression. There is no cure for "porous cylinder walls" outside of Dixon's Motor Graphite.

THE W. H. BRISTOL PORTABLE PYROMETER FOR MOLTEN METALS.

In making castings from molten metals and alloys it is often of great importance to know the temperatures of the metals, that they may be mixed, alloyed and poured at the proper ones to obtain the best results. A special form of pyrometer for practical shop use in such work has been designed by Wm. H. Bristol, 45 Vesey street, New York City, inventor of the low resistance thermo-electric pyrometer described in *The Iron Age*, May 17, 1906. The portable indicating instrument may be carried by hand from place to place and the temperature of a molten metal taken within two or three seconds. The possibilities and value of an instrument of this kind will be appreciated by those interested in foundry work.



(Cut secured through courtesy of the *Iron Age.*)

The outfit complete consists of a portable indicating instrument connected to a special thermo-electric couple, the two elements of which are disconnected and left without insulation. When the tips of these elements are slightly immersed into the molten metal an electric connection is made and the reading on the instrument will be the same as if the couple had been originally joined. The advantage of this plan is that the tips of the wires forming the element almost instantly assume the temperature of molten metal and the time lag error is eliminated. The general arrangement of the parts forming the outfit is shown in the accompanying diagram as it would be applied for taking the temperature of a crucible of molten metal just before pouring.

This form of couple has been successfully applied in measuring the temperature of molten metals, such as cast iron, copper, aluminum, brass, bronze and other alloys. When the tip of the couple becomes worn away by continued use, a fresh portion is exposed to the molten metal and the reading will be the same if the couple has not been very materially reduced. A separable junction is provided, as shown in the diagram, so that fresh tips can be conveniently applied before enough of the couple has worn away to appreciably affect the resistance and cause an erroneous indication on the instrument.

DIXON'S graphite publications sent free upon request.

THE OLD OAKEN BUCKET.

From *The Microscopical Bulletin*, Philadelphia, August, 1889.

F. J. Keeley, Conservator Biological and Microscopical Section, Academy of Natural Sciences, Philadelphia, Pa., considers the following a better parody on the "Old Oaken Bucket" than the one which appeared in July GRAPHITE, and we quite agree with him.

With what anguish of mind I remember my childhood,
  Recalled in the light of a knowledge since gained;
The malarious farm, the wet, fungus grown wildwood,
  The chills then contracted which since have remained,
The scum covered duck pond, the pig-sty close by it,
  The ditch where the sour smelling house drainage fell;
The damp, shaded dwelling, the foul barnyard nigh it,
  But worse than all else was that terrible well,
And the old oaken bucket, the mould crusted bucket,
  The moss covered bucket that hung in the well.

Just think of it! Moss on the vessel that lifted
  The water I drank in the days called to mind,
Ere I knew what professors and scientists gifted
  In the water of wells by analysis find.

How ardent I seized it, with hands that were grimy,
  And quick to the mud-covered bottom it fell;
Then reeking with nitrates and nitrites, and slimy
  With matter organic, it rose from the well.

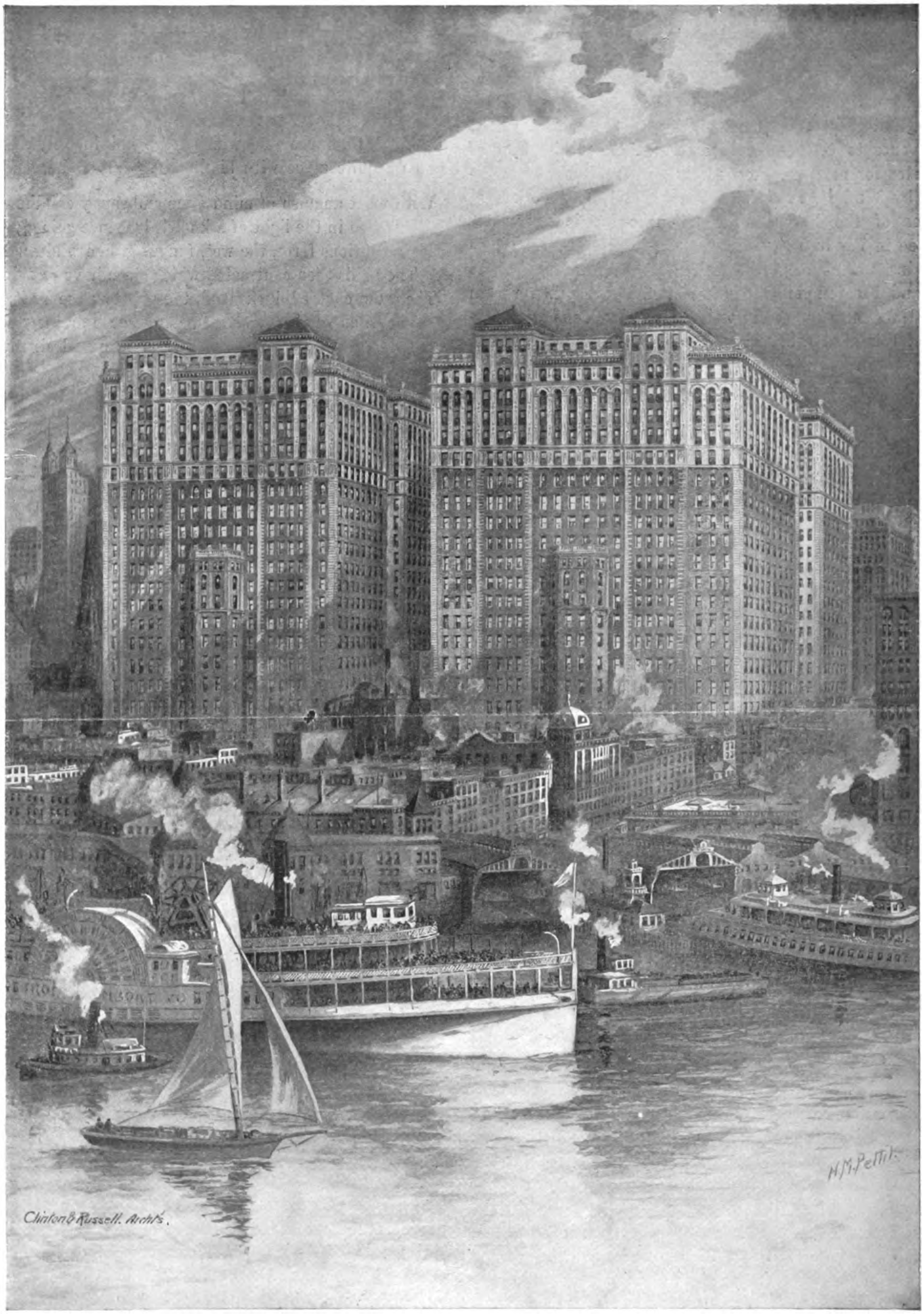
Oh! had I but realized in time to avoid them,
  The dangers that lurked in that pestilent draught,
I'd have tested for organic germs and destroyed them
  With potassic permanganate ere I had quaffed;
Or perchance, I'd have boiled it, and afterwards strained it
  Through filters of charcoal and gravel combined;
Or, after distilling, condensed and regained it
  In potable form, with its filth left behind.
How little I knew of the dread typhoid fever
  Which lurked in the water I ventured to drink;
But since I've become a devoted believer
  In teachings of science, I shudder to think.
And now, far removed from the scenes I'm describing
  The story for warning to others I tell,
As memory reverts to my youthful imbibing
  And I gag at the thought of that horrible well,
And the old oaken bucket, the fungus grown bucket,
The moss covered bucket that hung in the well.

—J. C. BAYLES, *President New York Board of Health.*

SITTING OR SETTING.

Power likens a manufacturing establishment that has its entire force working conscientiously along obsolete lines, and turning out out-of-date equipments, designs of which progressive engineers have long ago abandoned, to "sitting on china eggs." It may be that the hens that the editor of *Power* is familiar with, sit; our Jersey hens set, though we believe that Webster does not concede this function to the hen.

WE ARE TOLD that New York has forty-eight cemeteries within and near its borders.



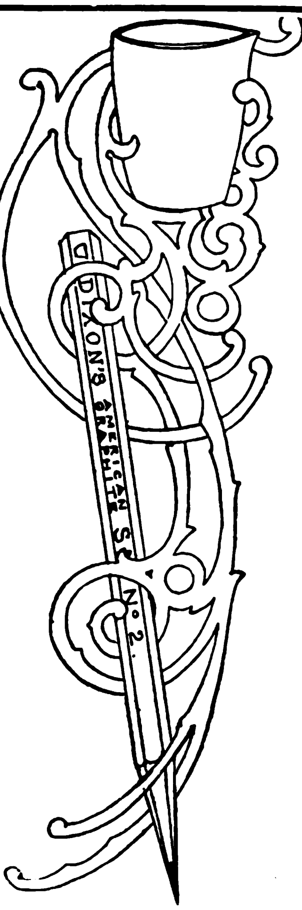
CHURCH STREET TERMINAL BUILDINGS, HUDSON AND MANHATTAN RAILROAD CO.

CORTLANDT, DEY, FULTON AND CHURCH STREETS, NEW YORK.

Largest Office Building in the World. Clinton & Russell, Architects.

STEEL WORK BEING PROTECTED WITH DIXON'S SILICA-GRAPHITE PAINT.

Graphite



VOL. XI. OCTOBER, 1907. No. 10.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

AN EXPLOSION OF A COMPRESSOR CYLINDER.

EDITOR *The Engineer:*

A curious accident recently happened in a silver mine in Utah. An explosion occurred in the air cylinder of a duplex Corliss air compressor. The accident resulted in the death of the assistant engineer and the serious wounding of the chief. The cause of the explosion was oil vapor in the air cylinder. The back head was shattered, while the back flange of the cylinder was torn off at several points, especially at the top where a portion of the cylinder was blown away.

At the time of the explosion the chief engineer was kneeling in front of the cylinder, adjusting one of the inlet valves, while his assistant was standing close by. He was hurled under a work bench about ten feet distant, while the chief engineer struck the wall in an unconscious condition. The two men were alone in the engine room and when the chief regained consciousness, he realized the compressor was running away, and struggled to the throttle, falling twice in an attempt to shut off steam, but finally succeeded, thus preventing the destruction of the compressor. The governor had been rendered useless by the explosion. Air was compressed to eighty pounds.

Such explosions fortunately are rare in air compressor service, and they serve to emphasize the importance of using the best grade of air cylinder oil. Cheap oil has no place in air cylinders or air passages, and even when the best oils are used, explosions may occur if too much oil is fed into the cylinders, and sufficient care is not taken to keep the valves and ports clean and free from deposits. A form of kerosene engine is made to act on the same principle, *viz.*, by explosions in the cylinders the same as in the air compressors.

In the case of the oil engine the heat of the cast iron effects the explosion, and in an air cylinder we have a similar condition in the shape of a hot cast-iron cylinder and heads. The temperature of air compressed to seventy pounds gage, from 60 degrees F., is raised to 404 degrees. The air lift system of raising water, of which the writer has charge, requires a temporary pressure of 125 pounds of air to start the water. Air at this pressure has a temperature of about 540 degrees Fahr., which is nearly the melting-point of lead. Joints about the air end of an air compressor should never be made with rubber, either copper gaskets, or metal to metal joints only should be used. To avoid any danger from explosions, the writer has adopted pure flake graphite as a lubricant for cylinder of the compressor, thus eliminating all possible danger of an explosion from oil vapor. I have the satisfaction of knowing that the cylinder is perfectly lubricated, at far less cost than with oil. After the use of pure flake graphite in air cylinder for over five years, I have concluded that this is the ideal lubricant when considering effectiveness, price and safety.—A. H. GOFF.

THE CARE OF TURN-TABLES.

The accompanying illustration shows the new turn-table of the N. Y., N. H. &. H. R. R., Plymouth Division roundhouse, South Boston. This turn-table, seventy-five feet in length, is protected from corrosion with Dixon's Silica-Graphite Paint. It is an interesting fact that Dixon's Waterproof Grease has proved an excellent lubricant for turn-tables and is being used by several important roads for this purpose.

DIXON'S Graphite Pipe-Joint Compound is of great value for nuts, bolts, spark plugs, and all pipe-joints on the motor car. Makes a tight fit, but prevents sticking of the parts—it resists all rust and corrosion. Put up for automobile use in four ounce collapsible tubes that make its application easy and convenient.

PROPER LUBRICATION PRESERVES THE LIFE OF WIRE ROPES.

The following clippings from *Mines and Minerals*, August, 1907, illustrate fully the importance of properly lubricating wire ropes. A wire-rope lubricant should be one that will lubricate both internal and external parts, and prevent corrosion from exposure to moisture, gases, and like influences.

The Joseph Dixon Crucible Company prepare two graphite products for the preservation of wire ropes, which meet perfectly all the above requirements. We have just issued a new booklet, "Wire Rope Lubrication," which explains fully the subject of wire rope lubrication, and contains much other useful information concerning wire rope. A copy of this booklet will be sent upon request.

WIRE ROPE TROUBLES.

Editor *Mines and Minerals:*

SIR:—In reply to R. J. P. in June number about the shrinkage in size of a 1¼-inch steel-wire hoisting rope, 600 feet long, 14 months in service. I have opened and measured the diameter of a large number of hoisting ropes which were in service from 1 to 3 years. I have not found a rope which reduced its diameter more than ⅛ inch and about 3/32 inch of this was caused by the crowns of the outside wires being worn flat. In ropes kept well lubricated I have never found the inside wires to be worn or broken. I know of a test being made of a hoisting rope (which was condemned on account of outside broken wires), by the firm which manufactured it and had tested the wires before the rope was made. Upon retesting it was found that the inside wires had lost only 1 ton of their original strength. Allowing for the wear on the crowns of the outside wires, the diameter of this rope did not change. This proved that a rope which is kept well lubricated and the diameter remains the same, except the wear on the outside wires, can be depended upon as long as the outside wires are good. I would not want to give my opinion as to the cause of the shrinkage R. J. P. refers to without knowing more about it, but if the shrinkage is as much as it appears from his letter, I would condemn a rope under the same circumstances. JOHN H. ARNOLD.

Scranton, Pa.

Editor *Mines and Minerals:*

SIR:—I read with interest the article on "Wire Rope Troubles" in your issue of June.

The writer has made a study of wire rope and finds that all standard-make wire rope on the market has more or less inner-strand friction after being used awhile, the amount depends largely on the size sheaves used (the smaller the sheave the more friction).

In one of the largest buildings in New York City the elevator cables are calipered every month and when the size shows a certain percentage of decrease the cables are removed and new ones installed, although the discarded cables show no outside wear.

Inner strand friction can be reduced and the life of the cables prolonged at least 50 per cent. by the use of a pure lubricant, free from coal tar and other acids, one that has a tendency to penetrate to the core, protect the exterior, prevent rusting and does not dry and harden.

Wire rope should have as much consideration as to lubrication as any engine, pump, or bearing; no one would think of running any of the above without lubricating the working parts. Why not wire rope? H. W. W.

New York City.

FUN IN THE PRESS.

Lives of all great men remind us,
As we read of their romance,
We could lick their small achievements
If we only had the chance.—*New York Sun.*

The bat looked up at the player bold,
And its smile was good to see;
Then it turned quite red as it softly said:
"You have made a hit with me."
—*Cleveland Plain Dealer.*

WE ARE TOLD that the largest license fee charged by New York city is $500, and it is that paid by pawnbrokers.

PRESSURE REDUCING VALVES.

By W. H. Wakeman.

Chapter V.

Fig. 29 illustrates a unique kind of valve for reducing water pressure to any point required. The reduced pressure acts on the diaphragm 2, and when the highest pressure desired is secured, it forces the outer end of the lever 3 upward, and as this action depresses the inner end 4, the valve is partially or wholly closed according to the required service, and a suitable pressure is maintained at all times. As illustrated in this case, the lever is pivoted at 5, but there are seven other holes into either one on which the bolt with a square head can be inserted, and as every such change makes a difference in the leverage exerted, the valve can be adjusted to a wide range of pressure.

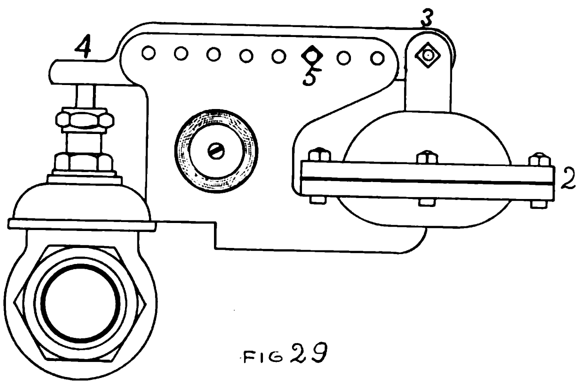


FIG 29

Fig. 30 shows another pressure reducing valve, through which water passes as indicated by the arrows. When it is shut off the spring shown holds the valve open by pressing it downward. As soon as water is turned on again it flows through the open valve until the desired pressure is secured on the outlet end, then water passing upward through the small passage shown acts on the broad surface of the diaphragm, overcoming the opposing spring and closing the valve by forcing it upward. It is fitted with a removable disk, so that it can be replaced at small cost when worn out. The top of this valve consists of a cap that is screwed on, hence the reduced pressure may be raised or lowered at pleasure, by adjusting this cap, or it may be removed and the spring taken out for cleaning or repairs, as water does not come in contact with this spring so long as the diaphragm is whole. When it is worn out a new one can easily be inserted by removing the cap screws shown. The bottom of this valve consists of a large plug screwed into place, that can be removed easily whenever it is necessary to take the valve out.

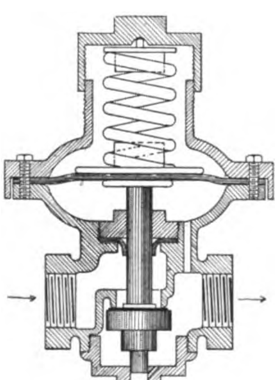


FIG 30

It is a good idea to remove the cap mentioned when it is new, and cover the spring with Dixon's Graphite mixed with engine oil, as it will prevent rapid corrosion of the metal. As water does not come into direct contact with the spring it cannot be washed off and contaminate the water, for although graphite is good for use under a great variety of conditions, it is not recommended for drinking purposes. The threads of both cap and screw should be coated with the same mixture, thus keeping the movable parts in condition to be turned easily when required. For use where the parts are exposed to the temperature of steam, it is well to use cylinder oil as before mentioned, because it will stand the heat, but for cold work a good engine oil will be satisfactory.

Fig. 31 illustrates a water pressure reducing valve fitted with what is commonly called a spiral spring, which is much longer than found in many other valves. It is intended for use in a horizontal pipe, and is here shown with the valve below the pipe, but it may be reversed if conditions make it more convenient and practicable, as it will work equally well in either position. The lower part of it consists of a stout bracket that may rest on the floor, or it may be reversed and bolted to the ceiling, thus forming a substantial support for the pipe line in either case, instead of being an extra weight hanging on it. It is fitted with a brass union on each side, which should be taken into consideration when comparing prices of various kinds for a given size of pipe.

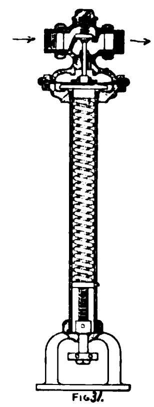


FIG 31.

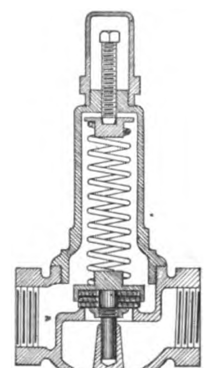


FIG 32.

This valve is now closed, but when not in use the tension of the larger spring holds it open, therefore water can pass through it freely in the direction indicated by arrows. It goes down through the small passage shown on the right hand side until sufficient pressure has accumulated on the diaphragm to overcome the tension of the spring, which is thus compressed until the valve is nearly or quite closed, according to circumstances. The small spring above the valve assists in this operation, but its tension must be overcome when the valve is to be opened. The small passage above mentioned is apparently closed by a screw, but this is not really so, because it is not solid, therefore it only acts to restrict the flow of water when the valve inclines to pulsate, or in other words to open wide and then close quickly. It thus serves the same purpose as a dash-pot on a fly-ball

governor. The reduced water pressure is regulated by a nut in which are two holes, located between the arms of the bracket. This is to be operated as if it were a globe valve. To secure more pressure, turn it the same as you would to open the valve. To reduce the pressure partly close the valve.

To some readers it may seem as if a water pressure reducing valve was never necessary, as in many cases the street main pressure is low and the only desire is to raise it as much as possible, but there are cases where the water pressure is too high for convenience and economy. For illustration take a building in which there are several water closets on the first floor where the pressure is high. Each one is fitted with a tank valve that shuts off the supply when the tank is full, but it must be of the balanced type and work easily, or else the small float provided will not operate the valve. If water is admitted at a low pressure it will answer every purpose in such service, and the danger of tanks overflowing will be much reduced.

Where one or more faucets discharge into a sink under high pressure, it is necessary to open them slowly or else water will be thrown out on everybody within two or three yards, to the disgust of all concerned, especially if air is discharged with the water.

In the average establishment it is certain that more water will be used where the pressure is high, for the following rea-

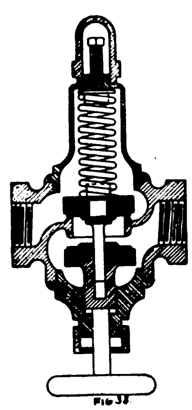


Fig 33

son. Take for illustration the case of a man who wants a drink in warm weather. He knows that all water standing in the pipes near the faucet is warm, therefore he allows it to run to waste, keeping the faucet open as long under high pressure as he would if it was reduced one-half, although much more water escapes under these conditions. Where this is repeated scores of times every day it makes a great difference in the water bill, although it assists greatly in giving us a high standard as a people that use many gallons per capita each year.

A very good illustration of the indifference shown to varying conditions is found in the following incident. A certain manufacturer decided to supply his workmen with cool drinking water during the summer months, in place of the lukewarm article secured fom the street main. He had an ice box made, containing a coil of pipe long enough to cool water nicely when it was drawn slowly, or fast enough to supply the amount actually drank. Of course the water was quite cool when the faucet was first opened, but this fact did not cause them to draw a cup full and drink it when wanted, as they continued to let it run to waste just as they did when it was necessary to let out several quarts in order to get a satisfactory drink, consequently much ice was wasted, the employer became disgusted and discontinued the service.

Fig. 32 is a very simple water pressure reducing valve, that is controlled wholly by a spring. This can be adjusted for required pressure by removing the cap at the top, and turning the screw downward to increase, and upward to decrease the pressure. If the reduced pressure is low, the valve may be closed when not in use, but when the entering water acts on the under side of it the disk will be raised against the tension of the spring. Care must be taken to connect it so

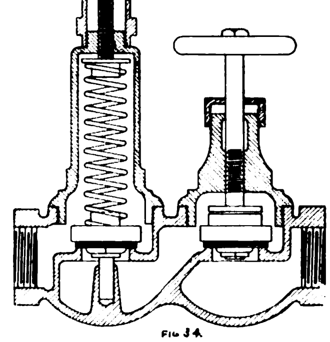


Fig 34

that the high pressure will thus operate, or else the valve will not open at all. This is in accordance with the plan usually adopted by engineers when connecting globe valves to steam pipes, as it is possible to close them and pack the stems without entirely removing pressure from the valves.

Fig. 33 is a very ingenious combination of a globe valve for entirely shutting off the supply of water at pleasure, and a reducing valve for automatically changing the pressure to any desired point within reasonable limits.

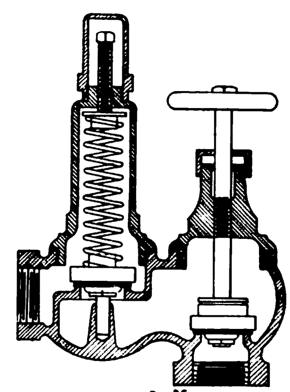


Fig 35

Fig. 34 is a somewhat different combination of the same valves to secure like results. In the preceding case one of the valves must be inverted, which is not satisfactory to some engineers, although there seems to be no real objection that applies to all cases. In the latter case both valves stand together, and they should be located as shown with the wheel above the globe valve, although the combination will work equally well if it is reversed.

Fig. 35 is another combination of valves to secure the same result, but an angle valve is used to shut off water

when necessary. This arrangement is much better than a globe valve, a nipple and an ell where there must be a turn in the water pipe, as it looks and operates better.

These three combinations are desirable wherever conditions will admit of their use, because they insure the use of good valves, and require less joints in the pipe lines than would otherwise be necessary. Examination of water pipe lines in use under different conditions, shows that in many cases cold water under pressure gradually works through a threaded joint until the resulting corrosion is unsightly at first, and later on it becomes dangerous because it affects the strength of the pipe. For this reason, also because few joints in a pipe line always mean less expense, efforts should be made to use as few as possible. There is always more or less foreign matter in a new pipe line, therefore before a pressure reducing valve is finally connected, it is a good idea to allow water to flow through the pipes and remove everything that can be dislodged by this means, then put the valve in place. Failure to do this has prevented the successful operation of many valves that otherwise would have been considered very efficient.

When designing a pipe line for conveying water it is well to remember that this liquid is not elastic, hence it is useless to provide a closed tank in such a line, near the place where water is to be used (the same as a receiver is sometimes placed in a steam pipe line near an engine), because water can only be drawn out of such a tank as fast as the inlet pipe delivers it and no faster, therefore the whole line must be made large enough to deliver the greatest quantity of water required per minute, as a closed reservoir or tank under pressure cannot be utilized to supply a large quantity in a short time.

A 2-inch pipe will supply at least four times as much water as a 1-inch, under the same conditions, because its area is four times as great, also owing to the fact that as the diameter of a water pipe is increased, friction is decreased in proportion to the amount of water delivered. Furthermore, if a small pipe is used, the velocity of the liquid must be high accordingly, and this greatly increases the friction.

For illustration of this idea take a 1-inch pipe 100 feet long and force 20 gallons of water through it per minute. The velocity will be 8 feet per second, and the friction will be so great that pressure at the outlet will be 12 pounds less than at the inlet. If we use a 2-inch pipe 100 feet long for the same quantity of water per minute, the velocity will be less in due proportion, or 2 feet per second and the friction will be so small that pressure at the outlet will be only one-half pound less than at the inlet. On the other hand, if we increase the flow of water in the 2-inch pipe until the pressure is reduced 12 pounds at the outlet (as with the 1-inch pipe), the quantity delivered will be increased to 110 gallons per minute.

(To be continued.)

Do YOU know that there is at least one Dixon Pencil made expressly to meet your work or pleasure? Just the size you want, just the shape you want, just the right degree of hardness and softness you want. Write for a free copy of "Dixon's Pencil Guide," which will tell you what pencil you should use for the greatest satisfaction.

CRUCIBLE TONGS.

The life of a crucible is influenced largely by the handling, and second only in importance to the annealing and the first heating is the fit of the tongs and the kind of tongs used. There are three general styles of tongs in use, which may be classified as follows:

One-pronged tongs;
Two-pronged tongs;
Spade tongs.

The latter is so named because the bottom part is shaped like the ace of spades. These three styles may be either of the ring pattern or the grab pattern, as shown in the cut.

The one-pronged tongs may be satisfactorily used on small crucibles only, but for sizes above No. 40 the two-pronged tongs should be universally used. It is a matter of no vital importance whether the bottom prong is of the spade pattern or like the illustration. The main thing is to have them fit the crucible perfectly from the bilge or widest part of the pot down to within 2″ or 3″ of the bottom. If the tongs come too near the bottom of the crucible, they are liable to interfere when setting it into the shank. If too much space is left, the pot is liable to be squeezed.

It should be borne in mind that the crucible tongs should take hold of the pot below the bilge and lift it out of the fire with the least possible pressure, just the same as if it was picked up in the shank or in a basket. It may be said that it is impossible to put the tongs low enough down on the crucible in a coke or coal fire, and, under certain conditions, this may be the case, but we are quite sure that in nine cases out of ten, if the furnace is of the proper construction and the firing intelligently done, that there will be no necessity for lifting the pot twice, first out of its bed by taking it with the tongs above the bilge, thereby not only injuring the pot but pressing the tongs out of shape, and secondly, placing the tongs where they belong and bringing it from the furnace. The fuel space around the crucible and at the bottom should be sufficient so that one firing will take off the heat. In the case of smelting and refining companies, who are melting light scrap, this may be impossible, but with the rank and file this can easily be done. The consequence is that, when the crucible is ready to pull, the fuel has settled down and practically disappeared, and there is no trouble about putting the tongs where they belong.

The spade pattern tongs were designed to push the fuel away as they went down alongside the pot, but they have not quite the bearing surface of the two-pronged style.

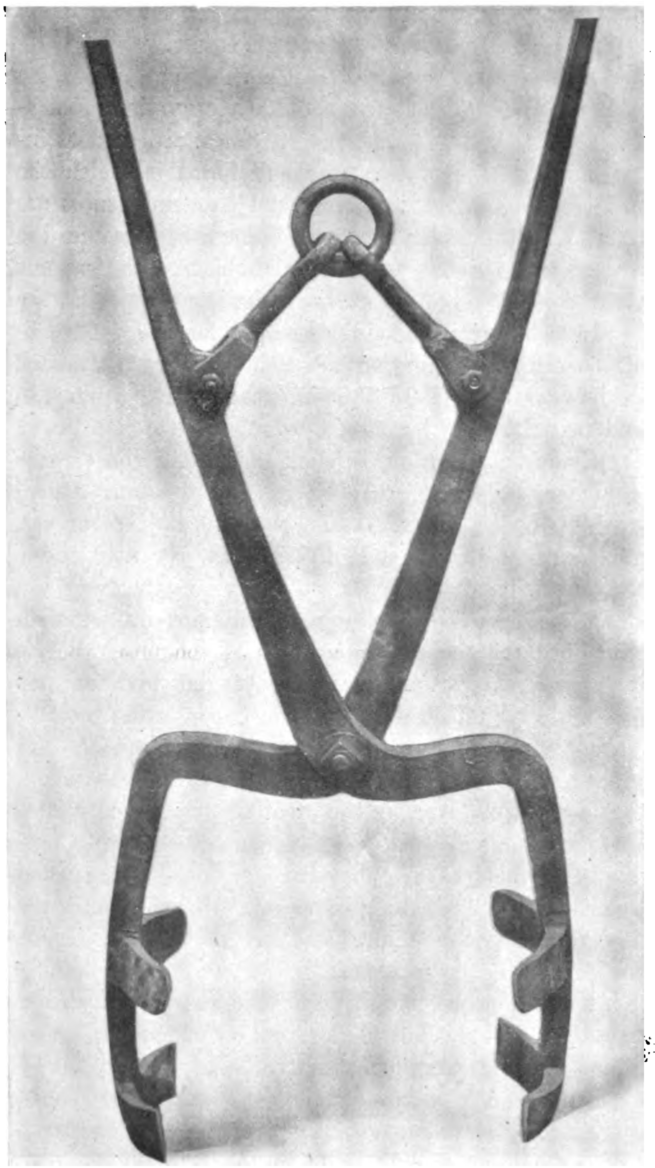
In the two-pronged pattern the lower prong does most of the lifting and the upper prong steadies the crucible so it will not wobble, but both should fit snugly. In the illustration it will be noted that there is ample space between the tongs and the side of the pot above the bilge, also that the tongs are square-shouldered. This is to prevent possible squeezing of the top of the pot. It is too often the case that the tongs are made with round shoulders so that, when they are placed well down, the first point of contact, as they close together, is the extreme upper edge of the crucible, and it is inevitable that pieces will be broken out of the pot.

We have seen large crucibles, size 200 to 300, lifted from the fire with one-pronged tongs which were bow-legged, that is, the first and only point of contact was the bottom of the lower prong, and it is plainly to be seen that this practise will soon cut the crucible in two.

We have also noted tongs that were originally of the two-pronged pattern, used on size 60 and 70 crucibles, with the lower prong cut off on account of the small space between the pot and the furnace wall, and the consequence was every pot of metal was lifted from above the bilge; also crucibles pulled from the fire with one-pronged tongs where the prongs were bent so the crucible was tilted way to one side by the time it reached the top of the furnace, all of which can readily be seen is bad practise.

We repeat that the one-pronged tongs should be used only on the smallest pots, or for the purpose of setting an empty pot back into the fire. We recommend strongly the two-pronged pattern for all other work, and above size 60 tongs of the grab pattern, as shown in illustration. Of course this necessitates some kind of a hoist, but when it is remembered that the weight of a No. 70 crucible full of metal, together with the tongs, is above 250 pounds, it will be plain that a hoist is not only a convenience but a necessity. The pressure on the pot is regulated by the weight, and with grab tongs properly designed and kept in shape, the pot cannot be injured.

On the small sizes, where ring tongs are used, the handles should be made light and springy and stand just the right distance apart when in position to receive the ring, so that it will be impossible to squeeze the pot. It must be remembered that the crucible in its white heat stage is soft and leathery, and there is enormous pressure exerted when the handles are forced together and the ring driven on, and, although no immediate bad results may be apparent, the crucible walls will be fractured little by little.



In well equipped, up-to-date foundries, two separate pairs of tongs for each size crucible are used, one for the crucible when it is new and another for the same crucible when it is half worn out. As the pot gets smaller after each heat, it is obvious that the tongs that fit a new crucible will be too large for an old one.

In some of the late oil furnaces they use tongs of the grab pattern with the handles above the ring bent over at right angles; as there are no ashes or fuel to contend with in the oil furnace, the tongs go right to their place without effort, and these bent handles allow the operator to stand off to one side.

In a later issue we shall have something to say about an easy and satisfactory method of keeping the tongs in shape, but what we desire most to impress upon the minds of our customers now is the importance of having the tongs right and fitting properly when they are new.

DUDLEY A. JOHNSON.

IN NINETEEN HUNDRED AND NOW.

There is, oh, so much for a man to be
In nineteen hundred and now,
He may cover the world like the searching sea,
In nineteen hundred and now.
He may follow the rush of the city's roar,
And his song may sing where the condors soar,
Or may dip to the dark of Labrador,
In nineteen hundred and now.

There is, oh, so much for a man to do
In nineteen hundred and now.
He may sift the dust of Andromeda through,
In nineteen hundred and now;
Or may struggle and strive as a good man must,
For the wretch at his feet who licks the dust,
And never learns how to be even just
In nineteen hundred and now.

There is, oh, so much for a man to get
In nineteen hundred and now.
He may drench the earth in vicarious sweat,
In nineteen hundred and now.
And his wealth may but a life-long itch,
While the lowest digger within his ditch
May have gained the little which makes him rich
In nineteen hundred and now.

There is, oh, so much for a man to learn
In nineteen hundred and now—
The least and the most he should trouble to earn
In nineteen hundred and now.
The swirl of the suns as they onward roll,
The little he needs that his stomach be whole,
The vastness of vision to sate his soul,
In nineteen hundred and now.

There is, oh, so much for a man to try
In nineteen hundred and now,
The sea is so deep and the hill so high
In nineteen hundred and now.
And we sometimes look at our little ball,
Where the small are great and the great are small,
And wonder the why and what of it all,
In nineteen hundred and now.

There is, oh, so much, so we work as we may,
In nineteen hundred and now,
And loiter a little along the way,
In nineteen hundred and now.
Oh, the honey bee works, but the honey bee clings
To the flowers of life, and the honey bee sings!
Let us eat of her sweet and forget her stings
In nineteen hundred and now.

—EDMUND VANCE COOKE.

POWER TRANSMISSION BY MANILA FIBRE ROPE.

By George P. Hutchins.

Chapter II.

Transmission rope made from Manila hemp is particularly subject to internal wear unless scientifically lubricated with the best kinds of material. Weight for weight, these ropes are as strong as steel in the direction of their length, but have little transverse strength owing to their cellular structure. When the stems are sub-divided by machinery, the fibres are made peculiarly rough and splintery. When these rough surfaces are bent around a sheave, they slide on each other with much force, every part of the rope section rubbing upon its surrounding fibres. This may happen many times in one minute according to the distance between shafts. It is absolutely destructive to the rope life, the fibre being ground to powder. If the strands of a worn out rope are untwisted, a quantity of fine powder will be found in the interspaces between the yarns, produced from the total destruction of fibres by their internal movements with respect to each other. No rope can long endure this destructive abrasion without lubrication. The degree of skill with which the lubricant is applied and its character, determine to a great extent the rope's durability. Well lubricated rope outlasts at least four lengths of the same diameter rope laid up dry.

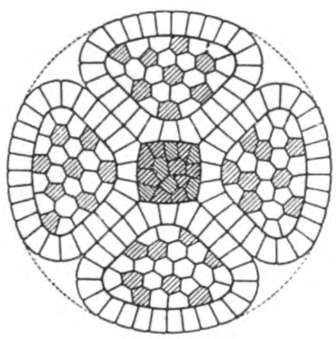


Fig. 4.

External dressings do not soak into the places where the real friction takes place, so that their effect is merely local, leaving the interior dry. Soaking the strands in tallow before laying up gives imperfect protection. Tallow has not "body" enough to cling to the fibres. It works out or dries out. The free fatty acids contained in tallow attack the fibres, and if it becomes rancid it causes the rope to rot.

"American" transmission rope, manufactured by the American Manufacturing Company of New York, is lubricated by thoroughly soaking the core as well as a number of inner yarns of each strand in a bath composed mainly of Dixon's No. 1 Flake Graphite, mixed with fish oils of a neutral character. Fig. 4 shows a cross section of a four-strand "American" rope, the shaded portions indicating the graphite lubricated core, or heart, and yarns of each strand. Special machinery has been designed for applying this bath to the parts selected for treatment without interfering with the process of twisting and laying up. This flake graphite is precisely the same material which has established its reputation among engineers for the lubrication of engine cylinders and bearings. It is not to be confounded with plumbago or black lead, an amorphous, gritty, impure graphite frequently containing considerable clay and lacking the lubricating value of Dixon's Flake Graphite. The lubricating compound here used, permeates all the fibres of the completed rope, lodging in the hollows, smoothing out the uneven places and forming layers of unguent between all fibre and yarn surfaces. This constitutes perfect lubrication. After a short period of service, enough of this mixture is soaked into the external fibres to form by action of the running sheaves, a glossy black metallic coating on the outside of the rope, which is absolutely impervious to water. Ropes thus lubricated require no dressing or any attention as to maintenance. If not absolutely abused, they will last ten years and even longer.

Special advantages of rope transmission are constantly being found, as its use is being extended to varying applications. No form of power installation can afford or does invite breakdown. But there are many forms in which the possibility of breakdown is so great and its consequences are so serious, that immunity from such occurrences becomes the principal feature of the engineering problem of laying out the plant details. The best governor does sometimes let the engine run away upon sudden release of all load by the breaking of a belt or its slipping off the main pulley. When such an accident occurs with its frightful possibility of injury to life and material from bursting flywheels and broken pieces of heavy machinery hurling through the air, it comes without a moment's warning. A belt has no structurally-independent, component units. As an entity it breaks through when it breaks at all. In rope drives on the contrary, if one or two ropes should break, the others can easily carry the additional load, as they are normally running at less than one-thirty-fifth of the ultimate breaking strength. Before the rope breaks it gives ample warning, as individual strands and yarns become unlaid, and are plainly seen or heard whipping about with much noise, or by actuating one of the numerous alarm devices which have been successfully installed. Another warning is given by the great stretch a rope undergoes before breaking. In the continuous system with a normal travel of the tension pulley carriage, passing the usual limits could be utilized to give alarm. In such cases the engineer, or anyone present, has time to stop the engine, thereby preventing he accident.

Often it is not a question of saving life and property from accidental injury only, but the prevention of long delays in operation. In the continuous system, the tension pulley gives usually enough leeway to allow the rope to be spliced without reducing the number of wraps, and if not, one wrap more or less will not interfere with safe carrying of the load, as the rope works at a very high factor of safety.

(To be continued.)

COMING WONDERS.

We read of the new light for microscopic examinations, —a light akin to the x ray—whereby an invisible object may be examined by an invisible ray of light and germ life studied not possible now under present conditions.

We also read of the "electric sleep" for operations to replace chloroform and other anaesthetics. A sleep that may be extended for hours with no injurious effects but rather with benefit, as on awakening there is a sense of increased physical vigor.

DIXON AT THE NATIONAL FOUNDERS' CONVENTION.

Joseph Dixon first began the manufacture of graphite crucibles in 1827. These were made after formulas and methods invented by himself and brought about many radical changes in the melting of metals. In 1868 this concern was incorporated under the name of Joseph Dixon Crucible Company, as crucibles were its foremost product and known favorably by practically all crucible users in the country.

Eighty years have passed since the first Dixon crucible was made and with the passing of the years has come fuller development. As indicative of this development we reproduce a photograph of the Dixon Exhibit at the late Founders' Convention, held at Philadelphia. Some little idea of the immensity of the Dixon crucible business is secured from the illustration shown. This first appeared in the July issue of *The Foundry*, which also gave the following synoptical description of the Dixon Booth:

DIXON, JOSEPH, CRUCIBLE Co., Jersey City, N. J.—At the four corners of this exhibit large retorts were placed, containing potted plants. In the place of a railing, crucibles of different sizes were arranged with the largest ones in the centers, graduating to the smaller sizes toward the retorts. One side of the crucible fence which enclosed the exhibit, consisted of new crucibles, and another was made up of diseased ones, each tagged to explain how the crucible gave out and the reasons for the same. Old crucibles that had run 60, 70, and 80 heats in Steele-Harvey furnaces and in the ordinary pit furnaces were also shown and labeled. Crucible fixings, such as stoppers, nozzles, stirrers, etc., were displayed in a show case on a pedestal stand and in another show case were placed glass bottles containing graphite for facings, etc.

GRAPHITE BRUSHES.

Dixon's Graphite Brushes are composed largely of graphite and are therefore a lubricating brush, and when used keep the commutator in a well rounded and highly polished condition, no high spots appearing with attended bad sparking.

The following letter from Mr. H. T. Plumb, Associate Professor of Electrical Engineering, Purdue University, is typical of many which we receive:

LAFAYETTE, IND., May 15, 1907.

JOSEPH DIXON CRUCIBLE CO.,
Jersey City, N. J.

Gentlemen:—Replying to your letter of May 11th, concerning the way in which the sample set of brushes worked. The brushes were used on a 10 K.W. exciter. This machine ran hot and gave continual trouble with sparking, so that the commutators required dressing down every week. The graphite brushes have been in use now for more than two months, the commutator has a fine polish and has given no further trouble from sparking.

I have recommended that the University purchase these brushes in the future.

Very truly yours,
H. T. PLUMB.

The little cares that fretted me,
I lost them yesterday
Among the fields above the sea,
Among the winds at play;
Among the lowing of the herds,
The rustling of the trees,
Among the singing of the birds,
The humming of the bees.

The foolish fears of what might happen—
I cast them all away
Among the clover scented grass,
Among the new mown hay;
Among the husking of the corn,
Where drowsy poppies nod,
Where ill thoughts die and good are born
Out in the fields with God.

—ELIZABETH BARRETT BROWNING.

THE VALUE OF DIXON'S TICONDEROGA FLAKE GRAPHITE IN RAILROAD SERVICE.

Dixon's Ticonderoga Flake Graphite (Perfect Lubricant) has been used for years by railroad engineers for helping them out when they have had hot boxes and an extra load to pull up a heavy grade. Many prominent railroad men have told us that they always were able, when they were runners, to pull two or more extra cars up a grade if they fed a little Dixon's Graphite to the cylinders through the relief valve or else through a special graphite lubricator.

Dixon's unctuous Ticonderoga Flake Graphite possesses the lubricating qualities that no other lubricant has, and because of its thin flake formation fills up the minute irregularities that always exist in metal surfaces in a manner that no other graphite can. Our booklet "Graphite as a Lubricant" explains fully how this is done.

Dixon's Graphite Curve Grease.

This grease is especially adapted where a cheap, durable grease is demanded, upon switches, interlocking devices, etc., and will outlast any other grease because of the flake graphite incorporated in it. Where the conditions are particularly trying it will always be found, on account of its adhesive nature and durability, making it the most economical lubricant for this use. As it only has to be applied occasionally, it lessens the risk run by the workmen where there is a large movement of trains.

Graphite Cup Grease.

These greases are particularly adapted for railway use. Being prepared in six different degrees of hardness, they will meet any conditions. Besides possessing all the merits of the highest grade petroleum greases, they have incorporated in them the right proportions of Dixon's Ticonderoga Flake Graphite, and when used there is no danger of delays due to hot pins or similar troubles and we have found that these lubricants are much more economical than any which can be used.

Dixon's Air Brake and Triple Valve Grease.

Professor Goss found, when experimenting upon the Air Brake Equipment of the American Master Car Builders' Association's outfit at Purdue University, that when Dixon's Ticonderoga Flake Graphite was used with a high grade grease that the action of the triples was much more delicate than it had ever been before. This led to the introduction of Dixon's Graphite Air Brake and Triple Valve Grease.

This grease is now being used successfully by many of the large trunk lines, giving most excellent satisfaction. Many air-brake inspectors have told us that they have eliminated nearly one-half of their air brake troubles since using it and that they consider it the best air-brake lubricant they have ever used. It is unaffected by climatic conditions, giving as good service in winter as in summer, and is well adapted for use throughout the whole air-brake system.

Oft did the harvest to the sickle yield,
Their harrow, oft the stubborn glibe hath broke;
How jocund did they drive their teams afield,
How bow'd the woods beneath their sturdy stroke!
—Gray's Elegy.

"PERKINS' PURPLE."

Fifty-one years ago, William Perkins, an assistant of Hofmann, as Hofmann had been of Liebig, detached from aniline a vivid violet at first called "Perkin's Purple." Hofmann, while an assistant of Liebig, showed that the wonderful coloring products of indigo or of coal tar were one substance, and named that substance "aniline." *The New York Times* says:

"What a wonderful expansion has taken place since! Over fifty aniline colors are now recognized in "the trade," ranging the whole chromatic spectrum, with all its intervals, while the original three, with their violences and crudities, seem to have passed out of use. At first and for years the artistic world was in arms against "the anilines" without discrimination. The ruin and destruction of Oriental art was confidently predicted when aniline dyes first made their appearance in the prison-made carpets of Lahore. But within the half century science has learned from art what art had to teach. Dyes that will tone and blend like those that had before been sought in the animal, vegetable, and mineral kingdoms, have been produced from the oil of coal tar. The distilling chemists have learned their lesson and applied it so as to deceive the very elect. This does not apply, for instance, to indigo. Provinces and tribes which lived by the culture of the indigo plant, which was the chief industry of South Carolina long before King Cotton came in, have indeed been forced to abandon their staple or starve. But the present indigo blue is a synthesis, chemically identical with the product for which it is named, and of greater purity, and is not an aniline color or derived from coal tar at all. But the cochineal insect is left to pine on his stem ungathered and to change the fate of being boiled to death to make carmine for the fate of being, to a great extent, not born at all. What there is left of him can no longer compete with science, and has the same reason to rejoice in the triumphs of chemistry as the sperm whale to rejoice in the achievements of the Standard Oil monopoly. Few discoveries indeed have done so much to affect the industries of mankind as the discovery of "Perkin's Purple."

VANADIUM AND AUTO CYLINDERS.

One of the most serious features of deterioration in cars is the loss of compression through the wearing of the cylinders. Foreign engine castings always have been superior to any American products in this respect, but few have understood why. Light has been thrown on the subject recently by some experiments made by the American Locomotive Automobile Company. It was found that the inside of the cylinder castings obtained here will take a polish from the piston action quite readily, but that very soon after the inside polish has reached its best, it begins to check and crack away, leaving roughness. To this is due the loss of compression. Some imported Berliet cylinders, tried under the same conditions, took higher polish and held it, the compression showing no loss after long service. The fact that the Berliet castings have a considerable percentage of vanadium is believed to partly explain the difference.

It is said that New York city consumes 5,360,000 pounds of tea annually.

FLAKE GRAPHITE VS. FAKE GRAPHITE.

Further back than the memory of present engineers extends graphite has been recognized among lubricants. In the earlier days the available supply was not pure enough and uniform enough to secure its use except for the roughest work, but this difficulty passed away many years ago with the advent of Dixon's Ticonderoga Flake Graphite. This has proved to be, during these many years, the world's only supply of an absolutely uniform flake graphite adapted to all forms of engine and machine lubrication. The growth of graphite lubrication has been the growth of the use of Dixon's Flake Graphite. Other graphites parading under the labels of "lubricating graphite" have come and gone and none of them have ever known recognition from engineers when placed side by side with Dixon's Flake Graphite.

Flake graphite has been demonstrated to the entire satisfaction of the chemist, the scientific expert and the practical engineer as the only form of this mineral which, above all other crystalline forms, is desirable for purposes of lubrication. In almost every book of reference in which the subject is treated at all, in reports of United States Geological Surveys, according to the logic of the theorist and the practise of the engineer, crystalline graphite is infinitely superior to amphorous or non-crystalline forms, not only because of its greater natural purity but because it is nearly impossible to separate the amorphous forms from the grit and other earthy impurities with which they are nearly always associated in nature.

We chose the heading of this little article to emphasize the importance of the form of graphite for lubricating purposes and to warn our friends against the employment of certain other so-called lubricating graphites which are fakes in more than one regard. We do not for a moment deny there are some other graphites offered for sale which are not wholly lacking in merit, but we also know that there are some simon-pure fakes that are making whatever progress they do make simply by stealing a ride on the back of the Dixon Band Wagon. We ask our readers to bear in mind the importance of the little "l" which makes all the difference between flake and fake and when anybody offers you, gentle reader, any lubricating graphite, just put it alongside of a little of the real Dixon Flake and ten to one you will see the difference that will not be discrediting to Dixon.

MISSION OF "THE TRAVELING MAN."

"Individual towels" is the slogan of the Wisconsin State convention of the Traveling Men's Association of America, at Madison. The delegates object to the endless towel slung on a roller as an accessory of the washroom.—*Rochester Post-Express.*

The commercial "drummers" are becoming veritable missionaries of the gospel of sanitation. The Wisconsin law, requiring sheets eight feet long on boarding house beds, was a triumph for the traveling man, but our truthful contemporary, the St. Louis *Republic*, assures us that in Montana landladies are now required, when asked, to truthfully state all the contents of the hash. Forlorn denizens of cheap hotels and hall rooms must invoke blessings upon "the traveling man."

—*N. Y. Herald.*

COST OF LIVING.

Expenses in Italy Compared With Those in America.

Consul J. E. Dunning reports that living in Milan costs on an average as much as living of the same kind would cost in the United States. He makes the following comparisons:

A family living in Milan, about as a family of similar size and position would live in Boston, must pay more for its subsistence and comforts than the American family pays. If an average American family of two adults and two children, with a total income of \$2,500 annually, were to be transplanted to Milan and should try to live here as it lives in the United States, it would have to pay \$400 for the rent of 9 rooms; \$420 for servants; \$50 for fuel (gas); \$40 for lights (electric); \$15 for servant tax; \$40 for telephone; \$600 for food; and \$35 for personal taxes; or a total of \$1,600.

Additional miscellaneous expenses, such as for clothing, traveling expenses, entertainments, medical attendance, and reading matter are not less than they are in the United States, when taken as a whole, and some of them are much more. Against two servants in America, in Milan there must be a cook, a housemaid, a laundress, a man to clean floors and beat rugs, and a porter, each of whom receive twice a year \$3 to \$5 each extra, besides liberal tips. Hundreds of others call for tips of 2 to 5 cents. Clothes for women and children can be made very cheaply in Milan, and their cheapness is immediately apparent to the most inexperienced observer. On the other hand, good clothing of this class, as indeed every article excepting men's outer garments, costs at least 25 per cent. more here than it does in the United States. Men's outer clothing costs slightly more than in England, but the quality and cut are inferior, except among the fashionable tailors, whose prices are high.

If the estimate for table expenses seems high, one must bear in mind that in Milan sugar costs 16 cents per pound, butter 28 to 30 cents, eggs 16 to 25 cents per dozen all the time, beefsteak 26 to 30 cents, milk 7 to 8 cents per quart, while coffee, tea, beans, chocolate, cheese and bread, cost as much or more than they do in the States. The servants drink at least \$2 worth of wine per month. Rice and red wine are cheap, plentiful, and good. Coal and wood are triple the prices in America.—*U. S. Consular Report.*

WE ARE TOLD that New York city is the home of about 198,000 widows.

ATTENDANTS in the large libraries of New York city report that "Les Miserables" is the most popular romance in general favor.

IT IS SAID that there has been a marked falling off in the Sunday school attendance in New York city in the last five years.

IT IS SAID that there are consumed by the people of New York city 1,008,700 pounds of sugar each day.

WE ARE TOLD that a model maker who has been in New York city for seventy-two years says that there are at least sixty-seven men in the city who are working on perpetual motion machines.

THE COUNTRY PAPER.

Amid the pile of papers
  That swamp my desk each day
And drive me weak with clipping
  And filing stuff away,
Comes once a week—on Thursday—
  The quaint old four-page sheet
That's printed up in Pelham,
  A drowsy county seat.

You see, 'twas up in Pelham
  That first I saw the light,
And—well, my heart grows softer
  And I feel my eyes shine bright;
Right reverent my touch is,
  It spreads the columns wide,
The local's what I'm seeking—
  The patented inside.

Ah, here it is: "The County,"
  And "Jottings," "Local News,"
You learn who's traded horses
  And who have rented pews;
It tells about the schoolhouse
  Where we used to sit and dream,
A-watching dust specks dancing
  In the sunlight's shifty beam.

The sturdy names of boyhood
  Come tumbling through our thought,
Of Tom and Brick and Patsey—
  How we loved and how we fought.
The friends when years grew graver,
  Called now beyond our ken,
In the type lines of the paper
  They live and speak again.

Oh, toilers in life's workshops,
  Are not those dream mists sweet,
Which memory casts about us
  When past and present meet?
And so, I love that paper
  From the village in the hills,
For the old life that it wakens,
  For the weariness it stills.

—NATHANIEL S. OLDS, in *Rochester Post-Express.*

CLEVER SAYINGS.

Better a dinner of herbs and contentment than a "stalled" auto in a far country.

When an old maid frolics, it is no child's play.

You must walk a long time behind a gander before you find a peacock feather.

It's an ill wind that escapes from the tire.

Despise not a small wound, an insignificant enemy, or a pinhole puncture.

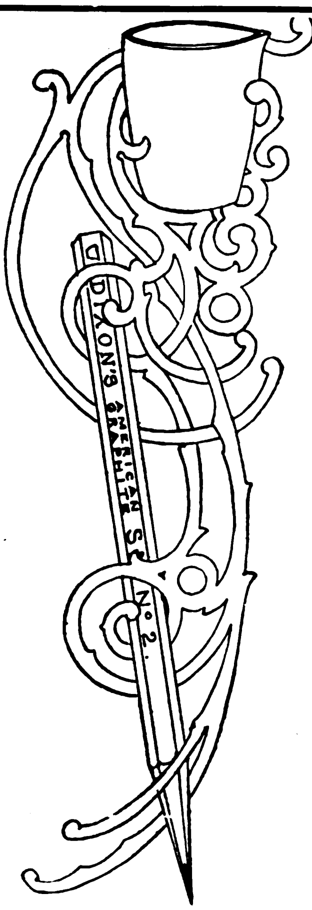
A rolling stone gathers no moss, but it loses rough corners, and will in time become a perfect sphere.

The most careful hen can't find things where she lays them.

No circus is as big as it's painted.—AGNES DEANS CAMERON in *Everybody's Magazine.*

Graphite

VOL. XI. NOVEMBER, 1907. No. 11.



Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.

ADVICE TO SALESMEN.

It has most truly been stated on numerous occasions by men in position to know what they are talking about that a salesman in order to succeed best must believe thoroughly in the line he handles and have thorough confidence in the house he represents. This thought is stated so excellently in a letter that a successful merchant recently sent to one of his salesmen, who apparently had not yet learned some of the essentials of his profession, that the letter is reprinted herewith:

"Your letter of the 13th inst., is in our possession, and I note that one-half page of your communication is devoted to the sales which you have made; a whole page is devoted to the sales which you have not made; then come three and a half pages concerning the sales which the travellers of other houses have made. I have analyzed the matter, and, after giving a thorough study to the subject of why you have not sold more for us, I have come to the following conclusions:

1. Other houses have better assortments than we.
2. Other people sell cheaper than we.
3. Other people are more popular than we.
4. Other people are much more expeditious than we.
5. Other people make better terms than we.
6. Other people are more highly esteemed by the trade than we.

I find that you will never become a thorough salesman until you believe that the house which you represent, the goods which you sell, the prices which you have, all these are the best that are generally to be had; that your firm is the best that you can represent, that you work for one of the largest houses, and that the customers must be lucky to be able to buy from your house.

This may not hold good in all cases—probably not—but if you wish to be a born salesman you must think so, act accordingly and induce all of your customers to think the same.

I should like to give you some good advice. Forget about your competitors, do not always bring them into your letters and conversation, do not mention them in the houses where you sell goods, do not mention them to your buyers, say nothing against them or their goods—forget them. If the buyers speak of other people, gently lead the conversation around to other matters, and then in a diplomatic manner return once more to your own wares, and sell the customer goods. That is the quintessence of business! Please do not write us any more what other people do, for your own business is the only thing that interests us."

This advice is so good that it cannot fail to prove helpful to all salesmen who take it to heart.—*Geyer's Stationer.*

WHAT ONE POUND OF DIXON'S AXLE GREASE ACCOMPLISHED.

The following sent in from one of our Boston representatives is only one of a number of testimonials we have received direct, as well as through our representatives.

If any of our readers who desire a can for trial will send us a postal card, we will send it free of expense to them.

BOSTON, MASS. Sept. 17, 1907.

J. H. Richardson, proprietor of the Cosmopolitan Stables on Pitts St., Boston, bought a new wagon in Philadelphia 14 years ago and with the wagon came a 1 lb. box of Dixon's Axle Grease. He used it on this wagon for 17 months and since that time has used Dixon's on all his wagons and those of his patrons in his care, among whom are such concerns as the New England News Co., Paine Furniture Co., Wood-Pollard Co., Tarbox Express Co., National Casket Co., Heywood Bros. & Wakefield Co., all of whom run from ten to forty wagons, and in addition he also cares for from fifteen to twenty smaller concerns who have from one to five wagons.

CHAS. A. SHAW.

WAS IT A DIXON AMERICAN GRAPHITE PENCIL?

Stephen Bonsal, in an interview with Tolstoy, published in the *New York Times*, says:

"For a moment, the same eager look came into Tolstoy's eyes that I had seen there from the road below. He remembered, it seemed to me, the long line of bold-faced men from America who had come to him. Then as though he wanted to laugh at something, and yet recognized his present duties as host, he said, 'You see this pencil? It was left me by an American statesman who called some months ago to consult with me about affairs of state. I shall always remember that man. It is the best pencil I ever had'."

We claim that this was a Dixon "American Graphite" Pencil, and it is "up to" our competitors to prove to the contrary.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Black Lead.

DIRECTORS:

EDWARD F. C. YOUNG, WILLIAM MURRAY,
GEORGE T. SMITH, EDWARD L. YOUNG,
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WASHINGTON, D. C., 925 Colorado Building.
BALTIMORE, MD., 1005 Union Trust Building.
LONDON, ENG., 26 Victoria Street.

THANKSGIVING.

For all the joys of life and sense
Which bring to sorrow recompense
For sunny day and starlit night,
For river's rush and wild bird's flight,
For healing wind and cooling rain,
For crowded mows and bins of grain;
For griefs that go and hopes that stay
Unto the Lord give thanks to-day.

For brain that gives its swift command
For seeing eyes and serving hand,
For willing feet, that daily go
Upon life's errands to and fro;
For chance to serve our fellow man
And work with God in nature's plan
For cheering friendships, loves that stay,
Unto the Lord give thanks to-day.

ROCK ELM, WIS. NINETTE M. LOWATER.

MICA VERSUS GRAPHITE GREASE.

We have been asked to explain the advantage of using a flake graphite grease, over a flake mica grease. We have been asked if the flake mica will not fill up the microscopical inequalities of the bearing surfaces in a manner similar to flake graphite.

We are very glad to explain the difference. Mica or soapstone are both classed among solid lubricants, but the authorities place the graphite largely in advance of either mica or soapstone as a lubricant. Mica is tough and hard. It is not so smooth as graphite, it does not yield as readily, and in the many tests made it is found inferior to graphite as a lubricant, whether the graphite is flake or amorphous.

Some advocates of flake mica call attention to the fact that it is a non-conductor of heat, and this claim is a very unwise claim to make, although it is true. The fact is that a lubricant should be a good conductor of heat, as well as a good lubricant, thus enabling the bearings to free themselves from the heat caused by friction of the bearings. To anyone who is specially interested in the question of lubrication by means of a solid lubricant, we shall be glad to forward our literature on the subject, which fully explains.

TEMPERATURE OF FAMILIAR THINGS.

Experiments with the optical pyrometer recently made are of interest as indicating the temperatures that are reached in certain operations and in the sun. These results are as follows:

Porcelain furnace	2498° F.
Glass furnace	2552° F.
Open-hearth steel	2795° F.
Melted platinum	3236° F.
Incandescent lamp	3272° F.
Arc lamp	7410° F.
The sun	13,712° F.

The results are of interest as they indicate the temperature of familiar things.—*American Machinist.*

"GRAPHITE is not only one of the best of lubricants, but the publication bearing that name and issued monthly by the Joseph Dixon Crucible Company, of Jersey City, N. J., is one of the breeziest trade publications which we get. Flashes of wit illumine its pages, and it looks as if some of the famous graphite was mixed with the editorial ink, so smoothly do the melodious sentences flow on the polished pages. A finely written biographical sketch of Vice President George T. Smith is a prominent feature in the September number. Copies may be had on application, addressed to the company's office."—*Locomotive Engineering, Oct.*

"Do unto the printed matter of others as you would have them do unto yours."

It is the practise in the Dixon office to carefully examine all printed matter that comes into the office. It is done by long experienced employees who are familiar in a good, general way with all the company's departments and wants. Some of the stuff goes in the waste basket; some is passed to superintendents; some to the officers and some is filed away for future reference.

PRESSURE REDUCING VALVES.

By W. H. Wakeman.

Chapter VI.

The more we read and study descriptions of various kinds of machinery, the more firm is our conviction that everybody wishes to have their production seem simple in design and construction to all who are interested. The reason for this is not hard to find, as nobody wants to buy a complicated machine for employees to operate. If a man intends to operate and care for an appliance himself, he may take pride in having others think that it is complicated and hard to manage, because he will then appear as an expert along that line, and if somebody else tries to take his place when he is absent for any reason, he does not mourn if they do not succeed in securing the same results that he does. Sometimes this feeling is carried so far that the machine or appliance is purposely left out of order, or is tampered with simply in a way to test the new man's ability to understand and adjust the mechanism in question.

To illustrate this point I will mention the case of an engineer who was leaving his plant, and in order to test the ability of his successor, he took a pin out of the valve gear of a duplex pump and laid it on the steam chest where it could be plainly seen. The new man attempted to start the pump, but it would not go, so he reported it to the owner who knew nothing about such matters. A general jobber was instructed to do whatever he considered necessary, and giving these instructions a very liberal interpretation he proceeded to take out the old pump and put in a new one, as he was sure that would prove a remedy, and it certainly did.

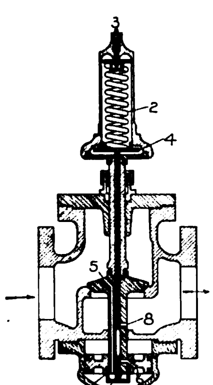


Fig. 36 illustrates a steam pressure reducing valve that is designed and constructed on scientific principles, and it will work nicely as long as the passages are kept clean and in good order. Whether this can be done or not depends on what is left inside of the pipes between the boiler and the reducing valve. The following description will make the operation clear.

A spring 2 is used to control the reduced pressure, and it is set as required by the screw 3. The tension of this spring is opposed by the reduced pressure acting on the diaphragm 4. Steam at high pressure enters the left hand passage as indicated by the arrow, but the main valve is now closed. A small part of it enters the port 5, passes downward and emerges through the port 6 into the casing where it operates on the main valve piston 7, which it forces upward, thus opening the main valve and allowing steam to go out as shown by the arrow at the right hand side.

A portion of this steam goes into the horizontal port 8 and passes up through the narrow vertical port until it acts on the diaphragm 4, and overcomes the tension of the spring 2. The effect of raising the diaphragm 4 is to close the auxiliary valve 9, thus shutting off steam from the port 6, therefore pressure falls in the lower casing until there is not enough to hold the main valve piston up, hence it falls and closes the main valve. This causes pressure to be lowered on the outlet side of the valve, consequently the auxiliary valve 9 is opened and the entire process is repeated. Only a slight rise or fall in pressure, as the case may be, from what the valve is set to carry is sufficient to operate the mechanism as above described, therefore under practical working conditions these changes are not great enough to be noticed so far as pressure in the steam heating system is concerned.

It is quite possible that this chapter may be read by young engineers who have not had much practise in reading drawings, therefore they do not readily understand detailed descriptions of machinery. I earnestly recommend that all such men commence at once to study the subject carefully, as even these chapters afford a good chance for practise along this line. One of the first drawings that I ever attempted to read and understand, was of Cite's releasing valve gear for Corliss engines, and the pleasure and satisfaction felt when the mechanism was clearly understood is not forgotten yet. It is much better to persevere in such a case until success is attained, than to get discouraged and cease to try further.

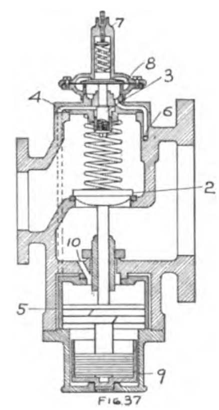


Fig. 37 is one of those reducing pressure valves on which the outlet is much larger than the inlet, thus giving the steam at reduced pressure a chance to expand freely at once. This design makes it unnecessary to state which is the inlet, as common sense would teach an engineer that the largest end is always the outlet.

The operation of this valve may be described as follows: Steam at high pressure enters at the left hand, but at this time the main valve 2 is closed and held down by a stout spring. The auxiliary valve 3 is open, admitting steam to the port 4 (the vertical part of which is shown in dotted lines), thus giving pressure under the main valve piston 5, forcing it upward and at the same time raising the main valve 2 and keeping it open until the heating system is filled at reduced pressure. At a point not less than ten feet distant from the reducing valve, in the heating system, a connection is made, usually for ½ inch pipe. This is carried back and connected into the port at 6. The auxiliary valve 3 is adjusted for the desired pressure by the screw 7, and when this pressure is secured, steam entering at 6 operates on the diaphragm 8 and closes the auxiliary valve 3, shutting off steam from the port 4, which allows 5 to fall and closes the main valve 2. A dashpot 9 prevents the main valve and piston from pounding under sudden changes of pressure. The piston 5 is a loose fit in its cylinder, therefore when steam is no longer required here, it goes out through the port 10 to the heating system. The entire operation is continuous, thus maintaining a steady pressure. This valve is intended for regulating pressure in a vacuum heating system. It has an iron body with composition mountings.

Fig. 38 is a similar valve except that it is all bronze, and made in smaller sizes only. The connection for the reduced pressure is shown at 2, which is on the inlet side of the valve.

This does not seem quite right, but it makes no special difference as the small pipe used can be carried to any required point. Brass pipe should always be used for this purpose, as it does not corrode rapidly. These valves are intended for use in horizontal pipes as shown in the illustrations. When it is necessary to take them apart for cleaning or repairs, slacken the screw at the top until all tension is removed from the spring. Remove the cap screws 3 and 4 (and all others in the same circle), and take off the spring case. Take out the large spring, leaving the main valve free. A hole is tapped into this valve, into which a threaded rod, supplied with each reducing pressure valve, can be screwed for the purpose of removing the main valve. Screw the rod into the main piston and move it up and down to be sure that it moves easily, bearing in mind that there is a dashpot connected to it which prevents too rapid action. However, these valves should work free enough to fall of their own weight.

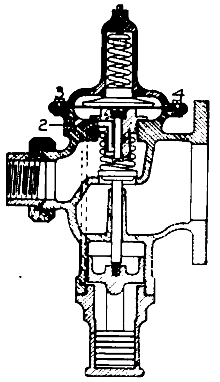


FIG 38

Fig. 39 has composition or bronze mounting, but the body is made of cast iron, with inlet and outlet the same size. When a valve of this kind is installed, the piping on the outlet or low pressure side ought to be enlarged close to the valve in order to allow the steam to expand freely to a lower pressure. It is not necessary to use a small pipe to connect the low pressure side to the top of the pressure reducing valve, as there is a port in the body of it as shown at the right hand side, to allow steam to come back directly from the main passage as indicated by the small arrow.

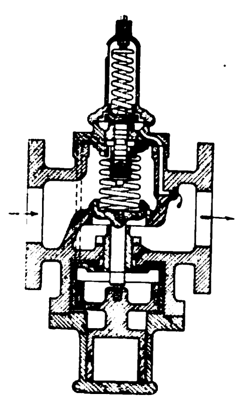


FIG 39

This pressure reducing valve is made in sizes from 2½ to 10 inches, suitable for a boiler pressure of 180 pounds or less, but a suitable spring for the reduced pressure required must be furnished with each valve. For illustration, if this is not lower than 5 nor higher than 50 pounds, a certain spring will answer the purpose, but if not less than 50 nor more than 140 is wanted, another spring, which is much stiffer, must be inserted. From 140 to 180 pounds still another is required.

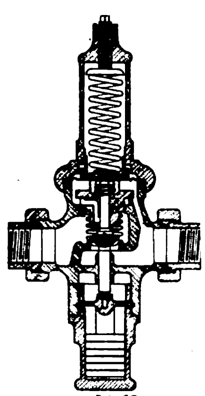


FIG 40

Fig. 40 is a similar valve except that it is all bronze, and is made in sizes from ½ inch to 2 inches only, suitable for a boiler pressure of 300 pounds or less. Three springs are required in order to cover the whole range of pressure, as explained in connection with the preceding illustration. One is for from 5 to 50 pounds, another from 50 to 140, and the third from 180 to 300 pounds.

Fig. 41 is similar to the preceding illustration, except that the diaphragm chamber is much larger, consequently a lower pressure on the outlet side will raise the diaphragm against the spring tension and close the main valve, as a larger area gives a higher total pressure, even if the reduced pressure is less per square inch. This valve is suitable for pressures in a heating system ranging from 0 to 5 pounds, but it may be used for as high as 10 pounds in some cases. It is only intended for small systems, as it is made in sizes from ½ inch to 2 inches. The same kind of a pressure reducing valve is made with an iron body fitted with bronze mountings, for pipes ranging from 2½ to 10 inches inclusive.

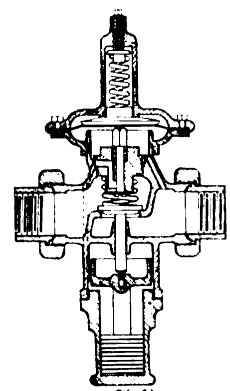


FIG 41

These valves which appear so nearly alike, but are so different in operation, are illustrated for the purpose of showing that is not always wise to judge a valve and the service to which it is adapted by its outward appearance. When valves are ordered from the manufacturer the service expected of them must be clearly stated and the result will be satisfactory, but where they are seen in use under certain conditions giving satisfactory results, care should be taken to avoid specifying the same kind when the service required is not exactly like the other. Do not change a valve from one system to another unless you know that it is adapted to that system.

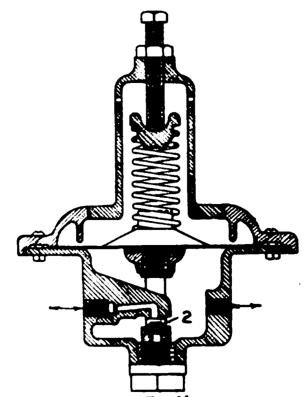


FIG 42

Fig. 42 illustrates a pressure reducing valve that is suitable for very high inlet and low outlet pressures. It is available for use in breweries and bottling works where gases, etc., are used under high pressure. When the reduced pressure has reached the point at which the valve is set, the diaphragm is raised, thus closing the valve 2 and shutting off the supply until the outlet pressure is lowered, when it is opened again, but the operation is continuous, thus securing a steady delivery pressure. With this class of regulator it is possible to receive pressure at 3,000 pounds and reduce it to one pound, or use it as high as 300 pounds, which is about the limit of extremes above a vacuum that one of these valves will be required for in regular service.

(To be Continued.)

WORKING HIS SYSTEM.

The manufacturer of a very excellent factory instrument sends us a nicely gotten up imitation typewritten letter, carefully stamped and signed, calling our attention to the merits of his instrument, its advantages and moderate cost. To clinch the subject he encloses a "partial list of users", and among them we find our own good endorsement.

GRAPHITE IN GAS ENGINE CYLINDERS.

The advantages to be gained by the judicious use of Dixon's Ticonderoga Flake Graphite in gas engine cylinders are many.

Having a strong affinity for metal surfaces, it fills all the microscopic irregularities and forms a thin veneer of flake graphite, which is very tough, possesses highest lubricating qualities, and separates the metal surfaces so there is no actual metallic contact, but rather there is substituted a graphite-to-graphite contact.

Amorphous graphite does not have the adhesive qualities that flake graphite possesses. Being a fine powder it has a deceiving appearance, and when rubbed between the fingers acts as though it would "stay put," but this is due to its fragility and the easy breaking down of its particles. It will not attach itself to metal surfaces, but will be washed away by the swiftly moving oil film. This is best illustrated by the following analogy: Take two stones, a round or irregular one, and a flat one, and put them both in a shallow stream of swiftly moving water. The round one will be carried down stream and the flat one will stay placed. Graphite acts the same in a film of oil, the flake graphite adhering to the minute irregularities of the metal surfaces, and the amorphous being washed about.

Most of us will recall the trick of taking a thin sheet of paper and holding it up against the wall or other smooth surface, and rubbing the hand over it a few times; how it will stay in place a considerable length of time, but only if the paper is very thin. This illustrates the adhesive nature of Dixon's Flake Graphite. Amorphous graphite, because of its irregular formation, cannot accomplish this.

When Dixon's finely ground Flake Graphite is used with oil as a gas engine cylinder lubricant, it is found that there is less oil consumed for lubricating purposes, the temperature of the exhaust gases is lowered, showing more heat available for actual work, and most important of all, if anything goes wrong with the oiling system there is not the danger of the piston being stuck fast.

We reproduce the following article, which appeared in *The Horseless Age*, June 19, 1907, which shows what experts think of graphite as a gas engine cylinder lubricant:

GRAPHITE IN THE CYLINDERS.

EDITOR *Horseless Age*:

Kindly inform me through the columns of your paper whether the use of a small quantity of powdered graphite is beneficial in the cylinders of four cylinder vertical auto engines.

If I am not mistaken I have seen the use of graphite in engine cylinders recommended in *The Horseless Age*, and I am anxious to have the truth of this matter, for the agent of my car claims graphite is undesirable in this engine on account of "improved packing rings," which is to my mind simply "hot air." I don't claim the graphite is by any means a necessity, but am laboring under the impression that a judicious use of a small quantity of graphite injected into the cylinders at intervals would reduce friction and wear—especially on a new engine. AUSTIN Y. HOY.

[Your impressions as to the beneficial nature of graphite are correct, and its use in the cylinders of internal combustion engines is recommended by many eminent engineers. In using it, however, care must be taken that too much is not applied at any one time. The "improved packing rings" should be an aid in its use, in that they would prevent the graphite from working up into the combustion chambers, where it might get on to the spark plugs and cause a great amount of trouble through short circuiting—this is the only thing to be considered against its use. If the graphite can be conveyed to the cylinder bores in the same way that the oil is fed to them great satisfaction will result from its use. Some remove the spark plugs and blow a little into the combustion chamber, but this practise is not to be recommended for the reason given above, and the additional reason that the graphite then to a large measure fails to reach the working surfaces. Many manufacturers use graphite in the testing rooms in working in new engines.—ED.]

The Dixon Company always advocates that graphite should be used sparingly with oil in the proportions of a teaspoonful to a pint for best results. To all those who are interested, we will be glad to send a copy of our booklet "Dixon's Motor Graphite—A Good Thing" which explains fully the advantages to be gained by the use of Dixon's Motor Graphite.

ESPERANTO.

At the fortieth annual meeting of the Massachusetts Association of Classical and High School Teachers, D. O. S. Lowell, of the Roxbury Latin School, spoke on "Esperanto; Its Value as a Language Study." Mr. Lowell is an enthusiast on this subject. He has aroused such interest among his boys that a large class has taken it up as a serious study, and anything he has to say regarding it is certain to be well worth hearing.

He declared, among other things, that, to his mind, the three greatest discoveries of the world were the alphabet, by which man expresses his thoughts; printing, which records them, and this universal language, which is to bring the world into international communication. This will tend to peace as well as progress. Esperanto is entirely practical, but its success depends upon the present generation. It needs not prophets but apostles.

Mr. Lowell has a class of forty-two students in the Roxbury high school, studying Esperanto.

"Graphite Suggestions" is the title of a very interesting booklet being sent out by the Joseph Dixon Crucible Company, Jersey City, N. J. The purpose of this little book is to sketch in a broad way some of the most important uses of graphite and to suggest a few applications probably not generally known. Among the most interesting chapters are "American Graphite," which gives the history of the Joseph Dixon Crucible Company; "Graphite in the Foundry," "Graphite for Bicyclists and Automobilists," "Pot Lead for Yacht Bottoms," etc.

The booklet ends up with a chapter on "Silica" Graphite Paint, which they make in four colors, natural (graphite gray), black, dark red, and dark green.

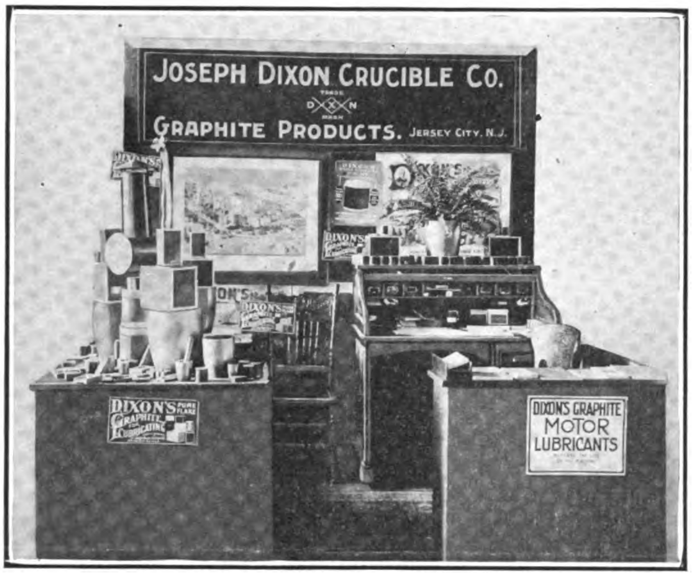
"Dixon's Graphite Suggestions" are worthy of careful reading and may be had by writing for the same.—*National Builder*.

DIXON'S graphite publications sent free upon request.

DIXON AT THE N. A. S. E. CONVENTION.

The National Association of Stationary Engineers selected wisely when they chose Niagara Falls as the meeting place for their 26th Annual Convention. The representative of the Mayor emphasized this fact in his address of welcome to the engineers, saying that a more appropriate place could not have been chosen owing to the wonderful natural power furnished the many power houses and shops surrounding the Falls. The entertainments were appropriately arranged and there were few dull moments for any one.

The Dixon Company showed all their graphite products which are especially adapted for the engine room, and it cer-



tainly was gratifying to hear the good things which the engineers had to say concerning the same. Some were in a reminiscent mood and told how they first came to use Dixon's Flake Graphite as a lubricant and how surprised they were at the good results obtained. Among our more recent graphite products which excited attention, were Dixon's Graphite Brushes. Some of these brushes were exhibited which had been in service for over eighteen months, showing excellent commutation and entire absence of sparking or arcing.

Dixon's Silica-Graphite Paint was appropriately shown on a miniature smokestack and boiler. It has been our aim to meet the demands of engineers and to place before them in an attractive form our experiences and the experiences of others. Having come in contact with shop conditions and methods since 1827, we are continually finding new uses for our graphite products.

Mr. John A. Condit, New York State representative, Mr. Walter F. Swearer, of the Silica-Graphite Paint Department, Jersey City, and Mr. L. H. Synder, of the Lubricating and Electrical Departments, were in attendance.

POPE'S UNIVERSAL PRAYER.

"Teach me to feel another's woe,
To hide the faults I see;
That mercy I to others show,
Such mercy show to me."

WHAT LUBRICATION IS AND DOES.

Concerning the Automobile.

The August issue of *Motor Print* contained an article under the first title given above by L. J. Buschman, B. S., Instructor in Gas Engineering, Case School of Applied Science. We are glad to be able to reproduce portions of this interesting and instructive consideration of automobile lubrication by such an authority.

"The lubrication of an automobile is one of the most important details, since upon it depends the very life of the car. The depreciation charge on an automobile is higher than on any other machine, as it receives rougher usage, even with the best of care. A car must go over rough roads, withstand sudden strains, while it is too often handled by those who are not mechanics.

There are three classes of lubricants, fluid, paste, and solid. To the first class belong the oils; to the second, the greases, and to the third, graphite.

The use of graphite is increasing in favor, not only in automobile, but in general engineering practise. When this form of lubrication is used, it is usually mixed with the lubricating oil. Experiments show that even one per cent. of graphite will reduce friction materially, although from three to six per cent. by weight is the usual proportion. One fault with graphite is, however, that it is apt to clog the oil leads, hence a special form of lubricator must be used. But since most cars have a force-feed lubricator this can hardly be considered a very grave disadvantage. One concern building air-cooled engines has recommended that to every pint of oil there be added a teaspoonful of graphite. The graphite has one great advantage, it "stays put." That is, it will fill in any irregularities in the frictional surfaces and give a permanent, smooth surface thereto; hence friction is reduced and less oil is required. Another manufacturer of stationary gas engines takes the last cut on the piston with a diamond-pointed tool and slow feed, resulting in very fine grooves; graphite and oil are used as lubricants, the graphite filling in the grooves, giving a very smooth surface.

The piston and cylinder fit closer as a result of this coat of graphite; there is less loss of pressure resulting, hence more power derived from the engine. Instances have been known where cutting has ceased when graphite was fed into the cylinder.

If graphite and oil forming a thick paste are rubbed on the threads of the spark plugs they cannot only be more easily removed, but a tighter joint secured as well. With the make-and-break system, the points can be cleaned by rubbing them with a fine file or with a piece of emery cloth.

The chain is difficult to keep lubricated owing to its exposed position, although the manufacturers are beginning to enclose them in a leather or aluminum case. The chain should be cleaned with coil oil and then soaked in lubricating oil. Graphite grease should be rubbed on thoroughly, this is heavy enough so that it will not work off."

What is the latest achievement of Luther Burbank?
—GARDENER.

We understand that he has just succeeded in crossing an eggplant with a milkweed and producing a custard vine.
—*Things Chemical.*

A SEA MONSTER.

In the greatest of the ocean monarchs, the Lusitania, is found not only the largest vessel afloat but also a new departure in driving power. The maiden voyage was a success in everything but beating the record of the Deutschland. The machinery worked perfectly, passengers reported a comfortable voyage, there was no vibration and the record from Queenstown was reduced by 6.5 hours. It was her first, and it is likely that other records will fall to her as time goes on.

As a boat and a power plant she ranks among the marvels of human construction. Her dimensions and capacity are as follows:

Length over all ft	785
Length between perpendiculars, ft	760
Breadth of beam, ft	88
Depth, ft	64.375
Gross tonnage	32,500
Draught of water, ft	33.5
Displacement, tons	38,000
Number of first class passengers	552
Number of second class passengers	460
Number of third class passengers	1,186
Total number of passengers carried	2,198
Crew, navigation, officers and men	69
Crew engineering	369
Crew personal, stewards, etc	389
Crew, total	827
Four turbines, Parsons type, H. P	68,000
Number of steam boilers	25
Number of boiler furnaces	192
Grate surface, sq. ft	4,048
Boiler heating surface, sq. ft	158,350
Coal to steam to New York, tons	5,000
Amount of cargo carried, tons	1,500
Steam pressure carried, lbs	200
Pounds of coal per I. H. P.-hour	1.45
Speed, knots	25
Revolutions of turbines per minute	140

From the record of the voyage the turbine has scored a success in the field of large marine propulsion and already plans are under way for a still larger turbine steamer for the White Star Line.—*The Engineer.*

CONCERNING THE ABSENCE OF ADULTERATION.

A prominent chemist, in writing to the head of one of the Dixon departments, says: "I have examined a number of your graphite products but never have found any adulterants in them; this is something remarkable in this age."

We regret our inability to give the chemist's name, for it would add much to the weight of the statement, but the letter from which the sentence was quoted was personal in its character, and the writer would probably not wish to have his name used in connection with what he would no doubt consider as an advertisement.

GRAPHITE KETTLES FOR GALVANIZING.

An article in the *Brass World and Platers' Guide* (June, 1907) describes the use of graphite kettles for melting spelter. Iron kettles are rapidly attacked by the melted spelter and not only is the kettle finally ruined, but the spelter itself becomes saturated with iron and has to be sold for dross. The use of the graphite kettles will obviate this difficulty.

The method in use for holding the kettles is quite novel. In order to prevent the graphite on the surface from burning out, a second kettle of sheet or cast iron is made to fit over the outside. A space of a few inches is left all around the outside between the two kettles. This space is filled with molten lead which effectually prevents the air from coming in contact with the outside of the kettle and thus burning out the graphite.

Kettles that have been in use for six months were recently taken out and they had deteriorated but very little.

"FEAR THOUGHT."

The *American Magazine* tells us that Horace Fletcher maintains that fear, anger, and worry can be entirely eliminated, not only repressed, temporarily, but gotten rid of for all time, if we will only set ourselves in the right direction to accomplish it. He says that he has done it for himself, and his cheery and unruffled temper is a fair example. He not only has destroyed the "fear thought" germ in himself, but has helped to destroy it in others. It is not a new idea, Mr. Fletcher assures us, but an old teaching, as old as Christianity, as old as Buddhism.

MONONGAHELA INCLINE RAILROAD, PITTSBURG, PA.

Four Tracks, Thirty Degree Incline, 370 Feet High.

Crossing the freight and passenger tracks of the Pennsylvania Lines West. Trains constantly passing under this structure, the stacks of engines coming within three, four and five feet of the steel work.

Two coats of Dixon's Silica-Graphite Paint, Natural Color, was applied to the Monongahela Incline Railroad steel work the early part of 1903. An examination of this structure September, 1907, finds Dixon's Natural Color has successfully withstood the severe atmospheric conditions of Pittsburg, and the sulphurous gases of engines of the Pennsylvania Lines West for four and a half years.

Dixon's Natural Color always fully demonstrates its ability to resist for the longest period of time, the active destructive action to steel work of sun, rain, ice, snow and gases.

FLAKE GRAPHITE AS A LUBRICANT FOR THE "MITCHELL" CAR.

The "Mitchell" motor car instruction sheet says in part: "For the successful operation of the Mitchell Motor Car it is necessary that the driver pay special attention to the lubrication. Flake Graphite mixed with oil is very good in the transmission, but if grease is used, it should be mixed with oil, so as to make a thin pudding. Flake Graphite and oil mixed with grease will make the rear axle bevel run smoothly and quietly."

This company, recognizing that the successful operation of their car depends upon perfect lubrication, has no hesitancy in recommending Flake Graphite as a benefit to good lubrication and the fact that they recommend Flake Graphite shows clearly that they do not believe just ordinary graphite (of the amorphous variety) will do.

The Dixon Company prepare a special grade of graphite lubricants to be used upon all parts of the automobile. These greases have incorporated in them the correct proportions of Dixon's Ticonderoga Flake Graphite which has been carefully determined after years of tests and practical experiences, and are fully explained in our booklet, "Dixon's Motor Graphite Lubricants."

"FLAKED" AMORPHOUS GRAPHITE.

The peculiar value of Dixon's thin Flake Ticonderoga Graphite has been so fully demonstrated that an application has been made in Germany and Austria for a patent covering the method of making "Flinz" or flake graphite out of pure amorphous graphite.

We understand this is not the only attempt in this direction, the object being to produce by means of powerful rolls, and a binder in the form of parafine or similar material, a thin flake of graphite that can more successfully compete with the thin, tough, Ticonderoga flake known the world over for its marvelous smoothness and endurance.

DIXON'S graphite publications sent free upon request.

POWER TRANSMISSION BY MANILA FIBER ROPE.

By George P. Hutchins.

Chapter III.

Continuous and Multiple Rope Drives.

The terms "multiple" and "continuous," used above, may require an explanation for readers not familiar with rope transmission engineering.

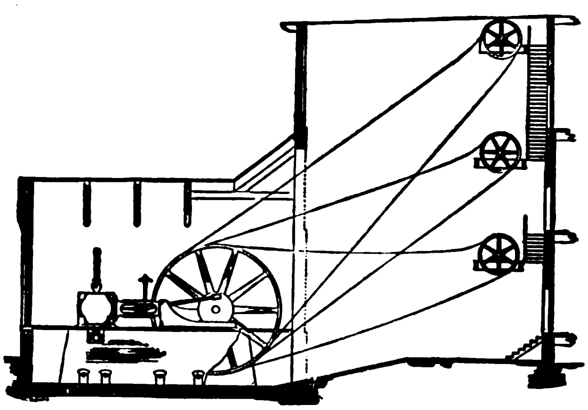


Fig. 5.

In the "multiple" or "English" system, rope is used just like a belt. One or more independent ropes run side by side, each in its own groove. It is not necessary that a separate sheave be fitted for each rope belt, but mechanically each pair of grooves on the drive and driven shafts acts as a pair of individual pulleys. The rope must be spliced to its required tension, slackening by stretching being taken up by resplicing. This might be considered a serious drawback, as rope is known to have much stretch. But just as there is a difference between "eggs" and "fresh eggs" there is a marked distinction between "rope" and "American" transmission rope. This being laid up under high initial tension, has so little subsequent stretch that ropes have been run more than two years without need of resplicing.

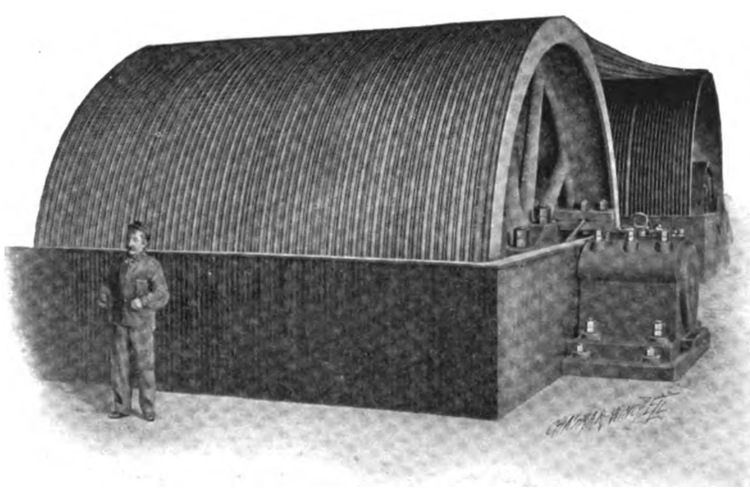


Fig. 6.

For driving the mainshafts on a series of different floors, from an engine in the basement or in an adjoining engine house, the English system is to be preferred. Such an installation for a cotton mill is shown in Fig. 5. This shows the simplicity and compactness of power distribution and the advantages over driving by intermediate stages from floor to floor, in which all the upper floors are shut down by breakdown on any lower floor. This is the cheapest of any system of power distribution to install, and the most efficient owing to the complete elimination of secondary or jack shafts and the power losses accompanying the extra bearings.

Fig. 6 shows an application of the multiple system, interesting on account of the large number of wraps used; sixty wraps of 2 inch "American" rope run from the main driver down to the rolling mill shaft, transmit about 3200 H.P. at the Sharon Steel Co.'s plant.

This vividly illustrates the enormous factor of safety provided in the great number of individual ropes, precluding all possibility of the engines running away from break in the transmission.

A modification of the English system is the "coupling" system, in which ropes are connected by detachable coupling instead of being spliced. This enables stretch to be taken up quickly, either by cutting out a section and adjusting the couplings farther along, or by twisting the rope, but it is less smooth and noiseless in running and produces more wear on the pulley grooves. It is objected to the multiple system that it is troublesome to splice the ropes in place, and that an unequal distribution of the total load and slippage with consequent wear, may be introduced by unequal stretch of different ropes or by renewing a single rope, providing a differential pitch diameter on the sheaves. Still, this remains the simplest form of drive, which for many conditions has unequalled advantages, especially when the driving and driven sheaves are about equal in size and are mounted on parallel shafts.

In the "continuous" system, also called the "American" because invented and principally used in this country, only one rope is used. This is continuously wound around the driving and driven sheaves in as many wraps as may be necessary to carry the load, and a loop is carried around one or more idler sheaves, one of which is mounted in a carriage arranged to work freely under the opposing pulls of the rope's tension and a tension weight. This construction automatically takes up the slack which may occur from stretch in the rope or fluctuations in the load or in the driving power, maintaining a uniform tension throughout the rope. An almost indefinite adaptability and flexibility characterize this system. Power may be sent in any path and at any angle following a properly arranged system of idlers, carriers, guides and deflectors. The least possible bearing pressure, minimum slip and a steady running of the rope, can be obtained by suitably varying the tension weight, adjusting the tension to exactly suit the requirements. For equal powers less rope is required in the American than in the English system.

In case of the 200 H. P. transmission to a driven shaft at right angles to the driver shown in Fig. 1, the shafts are so close together that belting would simply be out of the question.

Highly economical and efficient power distribution in large mills may be obtained by combining the two systems. A fine arrangement is to carry the power from a main jack shaft by suitable drives to departmental sub-stations, whence it is distributed by lesser drives.

While no hard and fast rule can be laid down as to the better availability of either drive system, it is generally accepted in this country that where the angle between shafts is sufficiently large to make a deflecting idler necessary, and particularly if in this case the distance between shafts is small, the continuous system is to be preferred.

In special cases where interference with operation, due to sudden rupture would have very serious consequences, two or more independent ropes have been fitted, each with its own tension sheave and weight, which would allow one rope to carry the whole load if needed, owing to its large reserve of strength.

In discussions of rope transmission, we often hear the fact deplored that the engineering profession in this country has not produced a specialized branch of power transmitting engineers, who would be immensely sought for and useful, not only in laying out distribution plans according to the precise requirements of each case, but also in educating the general body of engineers and the plant projectors up to the wonderful possibilities of transmission devices intelligently attuned to their particular ends. Mill owners stint no pains or expense to effect an economy in the generation of power, yet lose a large proportion of that power in its distribution to the work, namely from the idea that such losses are unavoidable. It is at that stage that losses count most, for the percentage comes off of an already reduced capital. Improvement in prime movers and in power tools follow each other so rapidly and in such numbers, that the consulting engineer of general practise has little opportunity to familiarize himself with the possibilities of or loss-reduction, certainty and smoothness of operation, and safety of modern developments in transmission engineering such as the rope drive.

(*Conclusion.*)

TRUE HAPPINESS.

What is there like true happiness?
No answer can I find,
It is a gift of righteousness
Which makes us true and kind.

True happiness comes through faith in God,
The one who is unseen.
Faith shows the way our Saviour trod
To the place which is serene.

In the winter we see bright sparkling snow
Which purity does reveal.
Bright stars above God's wonders show,
With praise in our hearts we kneel.

Dear summer time we love so well
When the earth is decked with green.
The fragrance of sweet flowers we smell,
Beauty everywhere is seen.

Bright birds are singing everywhere
Sweet tones of melody.
They all are in our Maker's care,
He thinks of you and me.

We have a better place in view
Where life is free from trial.
And Christ, the dearest friend we knew,
Will greet us with a smile.

With friends we'll gather round the throne
In perfect happiness,
No grief or sin will there be known,
No cares will us oppress.

On and on we'll ever live,
Our joy will have no end,
Abundant bliss our Lord will give,
Our everlasting friend.

—EDWARD HOLTHUSEN, Elgin, Ill.

RUNNING STEAM CYLINDERS WITHOUT OIL.

EDITOR *Engineers' Review*, Cleveland, Ohio.

Steam engineers have of late been learning that the use of oil for lubricating steam cylinders, pistons and valves is by no means a necessity. At a meeting of the American Society of Mechanical Engineers, held in New York, this subject came up for discussion in connection with the question, "What information can you give as to the best method for the extraction of oil from condensed steam, when it is desirable to use the exhaust steam for boiler feed purposes?"

In the course of the discussion it was made to appear that but little oil was really required for cylinder lubrication, and that cylinders might safely be run without it. Mr. John Fritz, the president of the society, spoke of one engine which had been run for a number of years without any oil in the cylinder.

We have been hearing more or less about the torpedo boats in the United States Navy, and have reliable information that upon several vessels of this class, the main engines as well as the Blake steam pumps are run without the use of oil in the steam cylinders. While the discarding of oil for steam cylinders is not a new idea, it has not been the practise to run steam pumps without oil. The pumps furnished for the torpedo boats by the George F. Blake Mfg. Co. are arranged without any oil holes whatever, so that it will be impossible to get any oil into the steam cylinders. These pumps have been given an exhaustive test for several days at the works, and they have operated with entire satisfaction without using a drop of oil. We have reliable information that the main engines on other torpedo boats are to be run without the use of oil in the steam cylinders.

Graphite, as a lubricant, is fast taking the place of oil. A journal that runs hot, and which can not be kept cool by any amount of oil, if lubricated with oil to which 10 per cent. of pure graphite has been added, will soon cool down and give no further trouble. A crankpin that will get almost red hot when lubricated with good ordinary oil, will run cool if lubricated with this same oil when a fair amount of graphite is added. The graphite fills all rough places and puts a polish like glass on the rubbing surfaces, which lessens the friction and improves the bearing.

Graphite is the ideal lubricant for valves and cylinders of steam engines. The writer has information that where a cylinder was badly cut from imperfectly fitted rings and the steam blew through, that after two months' use of pure flake graphite in the cylinder, the same was found to have a polish like a mirror and all cut places had disappeared. The valves on the engine had a beautiful polish and could be moved with much less power.

Pure flake graphite has been used on locomotives instead of oil with great success. The writer has been told by a certain engineer that he once ran a locomotive which used to stall on certain grades when pulling a stated number of cars. He began experimenting and when approaching these particular grades, he would put about a teaspoonful of graphite in each oil cup on the steam chest. He found the engine would go up the grade easily, that the reverse lever could be handled with less effort, and that he could pull three more cars up the grades with the use of graphite in the valves and cylinders than without it.

A test of graphite was made in Chicago at the plant of the Chicago Edison Co. The engine on which the trial took place was of the Porter-Allen type, tandem compound, condensing, 1,500 horsepower, making 120 revolutions per minute with a boiler pressure of 140 pounds. The amount of graphite used in this large unit was about three pounds in 40 hours, and it can be seen what a great saving there is in graphite lubrication when it is stated that if the best cylinder oil had been used, about six gallons would have been fed through the lubricator in the same time. These six gallons of oil would weigh about thirty-six pounds.

I have been asked this question, "How long is it safe to run an engine with the sight feed lubricator shut off on account of a broken glass?" My answer is this article on running steam cylinders without oil.—A. H. GOFF.

HE HAD JOINED THE UNION.

When he reached home he drew a roll of bills from his pocket and tossed it over to his wife.

"Better go shopping," he said. "Get some of those things that we thought we couldn't afford."

"Where did you get the money?" she asked.

"I drew it from the savings bank," he replied. "There's no use trying to save anything now."

"Why not?" she inquired.

"I've joined the union," he explained.

"Joined the union!" she cried.

"Yes, had to do it, so we'll have to spend this money in a hurry, if we don't want to get the worst of it."

"Why?" she persisted.

"Oh, I'll be on strikes of one kind or another most of the time now," he said, "and when I'm not striking I'll be paying strike benefits. The money is bound to go, and I want to be in a position to get as much out of the union as any one. If I have money in the bank there will be no strike benefit for me when I'm ordered to quit work. 'You don't need it,' they'll say, 'for you've got money. We can only afford to make payments to those who haven't any.' You see, there's a penalty put on thrift and a premium on shiftlessness. The man who saves has to pay himself for time lost at the order of the union, and the man who doesn't save gets the help. In a year from now our money will be gone anyhow, so we might as well spend it while we can get some personal advantage out of it, and then come in on even terms with the others for the strike benefits. It's the fellow who hasn't anything who gets the advantage. Take the money, Maggie, before it gets beyond reach. You helped save it, and the union will only help us spend it, if you don't do it first."—*Chicago Post.*

EGG TESTERS ON STRIKE.

The egg testers—the men who examine eggs in a darkened room with the aid of an electric light peephole, to see if they are "bad" or "good"—are on strike.

"The walking delegate of the Egg Testers' Union," said S. S. Long, of the firm of Long Brothers, in Warren street, New York, "requested us to discharge ten men because they refused to pay their dues to the union. I told the delegate that we could not be used as a collecting agency for the union, and the strike followed."

WHERE NO OIL IS USED.

An Ideal Condition of the Cylinders, also of the Boiler Tubes. What Dixon's Graphite did for the Reversing Links.

There have appeared from time to time in the columns of GRAPHITE various articles relative to the lubrication of steam cylinders, by means of dry graphite, or graphite and water, in place of any lubricating oil. The following letter has quite lately been received by us from one of the United States Naval Engineers, and as it bears on the matter it undoubtedly will carry with it much interest.

"Kindly send me one of your books, 'Graphite as a Lubricant', which I see advertised in *The National Engineer.* I am particularly interested in graphite lubrication as applied to steam cylinders where no oil is used.

"Our main engine is 18″ and 42″ x 24″, 125 revolutions per minute, 150 lbs. boiler pressure. We use no oil, either in these cylinders or in the cylinders of any of the auxiliaries, but I have introdued Dixon's Dry Graphite into the cylinders of an 18″ x 14″ x 14″ Worthington Duplex Pump, pumping against 140 lbs. pressure, with what seems to be good results. Any further information on this subject which you can give me will be much appreciated.

"I am of the opinion that the majority of engineers fail to fully realize the many advantages which are to be had from the proper use of graphite. Some years ago I helped to build, erected, and was Chief Engineer of the plant having the largest centrifugal pump in the United States. (Incidentally, this pump was the second largest in the world). The capacity of this pump was 45,000 gallons per minute, at a speed of 275 revolutions per minute. The engine was of 300 H. P. As we ran condensing I used no cylinder oil. Nothing but dry graphite.

"At the end of the season, which lasted about five months, I made a thorough examination of the cylinders, and found the walls looking like a polished boot. The important point which I am leading up to, however, is that the tubes and interior of the shells of the boilers looked as though they had been coated with stove blacking, and were so "slick" that no scale nor foreign substance could possibly get a hold on them. Neither were there any indications of pitting.

"I was about a year ago on a boat with a set of triple expansion engines with direct acting steam reversing gear, which could not move the links with less than 100 lbs. of steam. The introduction of Dixon's Dry Graphite into the steam pipe by means of an ordinary cylinder oil cup placed thereon remedied this trouble, so that in about two weeks 20 lbs. pressure did that which had required 100 lbs."

Not having received permission to publish the above, we omit name of the engineer.

AFTER TWENTY YEARS.

Four prosperous business men who had enjoyed many good times together in their youthful days met at a prominent Boston hotel after an absence of twenty years. Thinking that a cocktail might bring back pleasant memories of the past more vividly, one of the quartette invited his friends into the bar to have a drink. The first man said be would take a plain lemonade, the second man ordered plain soda and the third milk and seltzer. The man who invited his friends in looked at them a moment and then turning to the bartender said, "Give me a piece of squash pie."

Street Railway Section, Pages 877-887.

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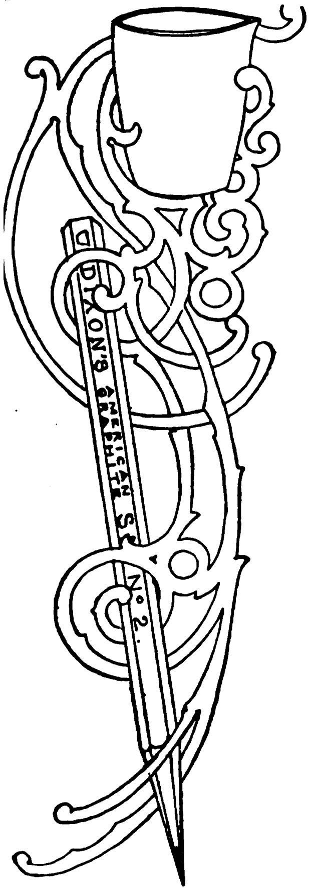
Graphite

VOL. XI. DECEMBER, 1907. No. 12.

Issued in the interest of Dixon's Graphite Productions, and for the purpose of establishing a better understanding in regard to the different forms of Graphite and their respective uses.



DIXON'S PAINT IN MEXICO.

Some paints are good in some places, but there are few paints that are good in all places.

This applies particularly to the preservation of metal surfaces exposed to varying climatic conditions.

Dixon's Silica-Graphite Paint has been on the market for forty years and during that time has made an international reputation for durability under varying and severe conditions of service.

Frequently we have letters from sea coast places telling of the manner in which Dixon's Silica-Graphite Paint has resisted excessive moisture and the destroying influences of sea air.

We have word this month on the manner in which our product resists the destroying heat of Mexico. A valued customer for many years, Senor Pedro B. Chisem, who is a banker and merchant of Guaymas, Senora, Mexico, writes that he is using Dixon's Silica-Graphite Paint at his Hacienda in the Yaqui Valley, for the purpose of painting the metal and wooden parts of plows, wind mills, frames, doors and all out-door work, and that the paint has no equal as a substantial and durable paint, in that it never changes in this hot climate and that it is of great value.

Senor Chisem states further that he has used it for the purposes mentioned for years and has never found any paints that compare with Dixon's Silica-Graphite Paint. Our good customer also acknowledges receipt of one of the illustrated calenders, showing in colors, the new City Investing Building, Broadway, Cortlandt and Church Streets, New York City; the steel work of which is being protected from rust with our product. Mr. Chisem informs us that in the month of October he will visit New York, and hopes to see this structure as well as to visit our works at Jersey City.

We are always glad to have letters from our customers, telling of the purposes for which they use Dixon's Silica-Graphite Paint, and the service that is rendered.

A MIXTURE of lead wool and graphite is now being successfully used for packing valves. It is used in the same manner that asbestos or other similar packing is employed. This mixture may be used for high temperatures and has some advantages over asbestos.—*The Brass World.*

EXPLOSIVE STOVE POLISH.

Application was made by Frank Lybolt, of Port Jervis, N. Y., attorney for Gordon, Marvin & Co., and Crosby & Co., defendants, in the action brought by Irving Clark to recover for injuries sustained by his wife and child, for a bill of particulars as to the manner in which was sold a certain brand of stove polish called "6-4-3." Some of this polish, when being used on a stove in Port Jervis last winter by Mrs. Clark, exploded and burned her and her child quite severely. As a consequence three suits have been instituted against the defendants named above. One by Mrs. Clark, one by the child, through Mr. Clark, as guardian, and one by Mr. Clark for loss of his wife's services. The defendants ask to know where the polish was bought, how it was bought, when it was bought, if it was advertised as being safe, etc.

R. M. Cox, attorney for the Clarks, objected because it would be giving away his case. The Court held that the defendants were entitled to know how and by whom the article was sold, and granted the request with $10 costs.

THE IRON AGE.

It is often said that this is the iron age. However, recent discoveries prove to us that iron was used more than 3000 years B. C. In the British Museum tools can be seen that must be all of 5000 years old. In China iron was used in the arts thousands of years ago. The Japanese knew the art of making steel before the Christian Era. However, the iron and steel industry of to-day is of such proportion that one would think that the supply of iron ore can last but a few years longer, and yet we believe that the supply will not be exhausted for generations to come. Modern methods of making steel are such that one pound of ore will go further than ten pounds twenty years ago. The modern machine of to-day requires not one-half the weight that it did ten years ago.

—*Gas and Gasoline Engine Guide.*

STOVE POLISH ROASTS HER.

Woman Runs, a Flaming Torch, as Garments Burn Off.

Pottsville, Pa., June 1.—After covering the kitchen stove with a patent polish, Mrs. Ferro, wife of a St. Clair hotel-keeper, ignited her clothing, the enamel suddenly catching fire. A flaming torch, she ran screaming into the yard. Though assistance soon came, the clothing was nearly burned from her body. She suffered terrible injuries, which will result in her death.

ESTABLISHED 1827. INCORPORATED 1868.

JOSEPH DIXON CRUCIBLE CO.,

JERSEY CITY, N. J., U. S. A.

Miners, Importers and Manufacturers of Graphite, Plumbago, Black Lead.

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THE BEST WISHES OF THE SEASON.

The following, under the above title, is from *The Youth's Companion* of 1906, and was reprinted on a beautiful card and and was sent out as a greeting from *The Youth's Companion* for the season of 1906-1907.

For sweetness and beauty we know of nothing that can surpass it and we therefore voice for ourselves these wishes to all:

TO THE solitary, the dwellers apart, by choice or by chance, with hearth-fires that for one burn dull and for two would glow and sing—to all of these,

A MERRY CHRISTMAS AND A HAPPY NEW YEAR!

To them that are set in families, where love, bestowed with no thought of its return, passes back and forth abundantly between open hearts—to all of these, parents, children, kinsmen, friends,

A MERRY CHRISTMAS AND A HAPPY NEW YEAR!

To the poor and the rich, envying each the others' freedom from the cares of too little and too much, yet learning year by year that without health and enthusiasm and faith and love, none can be rich, and with them none can be poor—to these

A MERRY CHRISTMAS AND A HAPPY NEW YEAR!

To the workers, the vast fortunate majority, in humble places and in high, often baffled and disheartened, questioning if there is not somewhere for them a greater work with a greater reward; yet happy at the last, if they will have it so, in seeing the figure they have wrought in the fabric of living, a figure drawn by the great Designer for their weaving and none other's—to all of these,

A MERRY CHRISTMAS AND A HAPPY NEW YEAR!

To old and young, with the years behind and the years ahead, years that show but a span in the centuries since the Light first shone from Bethlehem upon the paths of service, humility and sacrifice, and gave to all the ages a spirit that has made them one; to Young and Old, treading with gladness these lighted paths, even though not always knowing whence the Light comes—to all,

A MERRY CHRISTMAS AND A HAPPY NEW YEAR!

WHO NEXT.

Now and then some historian permits us to see some of our heroes from a different standpoint.

Now comes Capt. S. R. Donahoe of Fairfax, Va. who, after digging into the musty volumes in the clerk's office, tells us that George Washington was a tax dodger. This statement concerning the "Father of his Country" has brought down on the investigator's head the denunciation of many people, all of whom, curiously enough, seem to be located in the North. As the captain puts it George seems to be better known right around home. He says he thinks he will quit the history business after this, and adds:

"It may calm the perturbed spirits of some of these outraged patriots to know that on the desk of Richardson, the County Clerk of Fairfax, is lying a hatchet, aged and rusty, to which is attached a paper bearing this legend: 'The original hatchet used by George Washington.' This ought to offset the tax dodging, unless the fact that the implement bears the mark of a hardware firm in Bridgeport, Conn., may make some difference. Richardson says he got tired of telling visitors why he didn't have the hatchet, so he looked up one in the wood-shed and labeled it as above for the delectation of tourists, and he finds it does just as well as the original."

Capt. Donahoe says he has discovered many other interesting facts bearing upon the private life of the Squire of Mount Vernon, but after this present discouraging experience he's going to keep them locked in his bosom.

"DIXON CRUCIFIED."

The latest twist to the Dixon name comes to the Dixon Philadelphia branch:

"DIXON CRUCIFIED.
1020 Arch Street,
PHILADELPHIA."

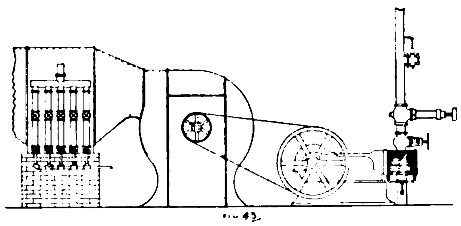
There have been times when we have felt that we were being "crucified."

PRESSURE REDUCING VALVES.

By W. H. Wakeman.

Chapter VII.

Having illustrated and explained a large variety of pressure reducing valves, it is now in order to illustrate ways in which they can be utilized in every day practise, and to show



their value in this service. Fig. 43 illustrates a steam engine used to drive a large fan which forces hot air into a building for heating and ventilating purposes. The speed of an engine used for this purpose must be changed to suit various conditions, for although ventilation is required at all times, still it is not necessary nor practical to send the same quantity of air into a building every day in the year.

Sometimes the air delivered by these fans is expected to heat the building independent of all other means, therefore a large amount of radiating surface is provided, over which the air is either drawn or forced, thus heating it to the desired temperature before it goes into the rooms that are to be warmed and ventilated at the same time. In other cases there is enough radiating surface directly in the rooms to heat them under ordinary conditions, and fans are provided for ventilation only. However, it is not practicable to send cold air directly into the building, as it would cool it off faster than it would be heated by direct radiation. Coils or banks of pipes are provided and filled with steam for heating the air, and these are divided into separate banks so that only the required number can be used.

The illustration shows five of them, and in warm weather they will all be shut off, as no heat is wanted. When the mornings become frosty two banks may be required, and as the weather grows cold the radiating surface in use must be increased, until all five are filled with steam.

It is not necessary to drive these fans at the same speed under all conditions, and in some cases if this plan was adopted it would render the building unfit for use. During warm weather, when the thermometer indicates 90 degrees or more, the maximum amount of ventilation is required, and one or two experiments will determine the speed that constitutes the highest limit. To secure this speed requires a certain pressure in the engine cylinder, and by changing the adjustment of the pressure reducing valve shown, the desired pressure can be secured. After this is once determined, it will always give the same speed, therefor when the reducing valve is set for it the same volume of air will be secured by bringing the adjustment back to that point after it has been changed for any purpose. It is assumed that the boiler pressure is higher than the required cylinder pressure.

Swinging to the other extreme and taking a very cold morning, it may be necessary to run the fans in order to secure the proper amount of heat (assuming that the machinery is not run all night) regardless of the ventilation required. It seems natural to send the greatest volume possible into the rooms, and this is correct, provided there is sufficient radiating surface to heat it, but in many cases there is not, consequently the speed of the fans must be reduced until the temperature is high enough to assist in heating the rooms.

For illustration of this action, when the outside temperature is 10 degrees below zero, if the fans are run at full speed early in the morning, air may be sent into the rooms at 50 degrees, consequently they will not be warmed enough for use, but a reduction of 40 per cent. in the speed may give a temperature of 80 or 90 degrees, thus securing better results, although the volume of air delivered is much less. The pressure reducing valve may be set for this speed at any time after the proper adjustment is determined. In the case of a spring-loaded valve a certain position of the adjusting nut will give good results, and if weights are used to secure various pressures, the desired pressure will result from the use of the previously determined number of them.

However, it is necessary in all such cases to prevent the belt from slipping, and this is accomplished by the use of Dixon's Belt Dressing, which preserves the leather and makes it possible to run the belt comparatively slack, reducing friction and making the bearings less liable to heat. This is an important consideration, especially where an engine is located in a place that is visited but few times during the day.

Conditions above mentioned include widely varying temperatures, but there are points between them which require speeds accordingly. A pressure reducing valve can be made to give the exact pressure that will produce these speeds, regardless of any reasonable variation in the boiler pressure, so long as it exceeds the pressure desired in the cylinder.

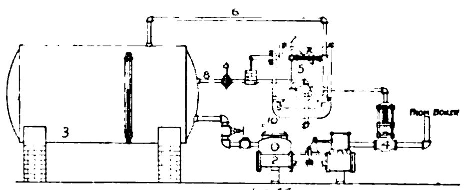


Fig. 44 represents a very interesting combination, and an explanation of it includes several important points with which every engineer ought to be familiar A steam pump 2 takes water from a surge tank (not shown), and delivers it into the pressure tank 3 of an hydraulic elevator on which 150 pounds pressure is carried in regular service. Suppose that the water cylinders of this duplex pump are 8 inches in diameter, giving an area on each of 50 square inches. The total resistance (for each water cylinder) to be overcome is $50 \times 150=7{,}500$ pounds exclusive of friction. The steam cylinders are 12 inches in diameter, each having an area of 113 square inches. The steam pressure required to balance this resistance is $7{,}500 \div 113=66$ pounds. Assume that it requires 10 per cent. more to move the pistons at a low speed, or $66+(66 \times .10)=72.6$ pounds, and 25 per cent. or $66+(66 \times .25)=82.5$ pounds for a fast speed, while the boiler pressure is 100 pounds.

From this it will be plain that the pressure reducing valve 4 must take steam at 100 pounds and deliver it at from 72.6 to 82.5 pounds pressure to the steam cylinders of the pump. In order to do this and maintain a nearly uniform pressure of 150 pounds in the tank the regulator 5 is adopted, which is

similar to a damper regulator. Pressure from the tank 3 is carried by means of the pipe 6 to the diaphragm 7 and overcomes the action of the weighted lever, thus admitting pressure from the tank 3 through the pipe 8 (containing the strainer 9) to the top of the pressure reducing valve 4, which delivers the required pressure to the pump as above described, to meet the variation in speed caused by operation of the elevator for which it supplies power. Waste water from the regulator 5 is discharged to the surge tank through the pipe 10.

If the plungers of these elevators are lubricated with Dixon's Graphite Grease, friction will be reduced to the lowest point, and the car will ascend quicker accordingly with the same tank pressure.

The device 4, which is here called a pressure reducing valve, is sometimes described as a pump governor, and thus is correct, because to a certain extent at least the terms may be applied at pleasure, as a pump governor simply controls the pressure delivered by it, which is precisely what a pressure reducing valve is designed for. When the pump stops it does not necessarily mean that all pressure is shut off from the steam cylinders, for in this case if it is reduced to 66 pounds and maintained there, the pump pistons will not move because the forces are balanced, and any pressure less than this cannot cause motion of these parts.

The surge tank receives water from the elevator, and as the water line rises and falls, the tank is exposed alternately to the action of water and of the atmosphere, therefore it corrodes badly unless measures are taken to prevent this by painting the entire surface with Dixon's Silica-Graphite Paint, which is prepared for all such conditions.

(To be Continued.)

AUTOMOBILE LUBRICANTS.

That an automobile can be ruined in two hours by lack of lubrication may seem improbable, but a dealer who has studied the problem of keeping the mechanism in perfect running order has made the assertion and advanced a brief argument of substantiation as follows:

"The object of lubrication is to prevent friction and wear by interposing a film of oil between the two bearing surfaces and thus prevent them from coming into actual metal to metal contact. If a piece of metal, perfectly machined and presenting to the unaided eye a smooth appearance, is examined through a powerful gass, the surface will be found to contain minute ridges and hollows. If two such pieces are rubbed together these irregularities will be ground off as the result of friction. This is exactly what happens when a bearing is allowed to run without the protecting oil films.

"Cylinder lubrication has still more to overcome, for beside preventing the friction between the piston and the cylinder, the oil must have sufficient lubricating qualities to lubricate under the intense heat developed by the rapid explosion which is estimated at 1,000 degrees Fahrenheit. Only the highest grades of mineral oils are capable of standing this temperature. Unfortunately, at the present time there are too many gas engine cylinder oils offered wich are entirely inadequate, and which, in fact, do not lubricate, and do not possess any lubricating values at high temperatures, though they may work perfectly at lower ones.

"If a strong motor develops full power for one or two miles under full throttle and then begins to gradually fall off, the chances are that the oil is not doing its work, because the temperature has risen to a point at which the oil will not lubricate. It is also a fact that the same oil in the same car will not always lubricate satisfactorily, for the reason that one driver keeps his motor cooler than the other. Those who have noticed a falling off in power after a long run in full throttle, let them try Dixon's Automobile Lubricant and they will be surprised at the result.—*The American Contractor.*

EXPLOSIVE STOVE POLISHES.

"As Dangerous as Dynamite." The Sale to be Stopped. Strange Position of Manufacturers.

Curiously enough, many dealers, it is reported in the papers, have decided together to obtain an injunction against the enforcement of the rule which is designed to protect the City of New York from what the officials of the Bureau of Combustibles call, "A danger more threatening to life and property than all the dynamite that has ever been brought together in New York."

Among the several household mixtures containing benzine or naptha, are insecticides and liquid stove polish. Under the new rules the manufacture and sale of insecticides or stove polish containing any benzine or naptha whatever, is prohibited.

It is stated that there is no doubt that hundreds of lives have been lost and thousands of dollars of damage done to property in New York alone, from such causes, and it is to protect the users of such articles that the new regulation has been adopted.

The Joseph Dixon Crucible Company has been manufacturing stove polishes since 1827, but has never made a liquid stove polish.

A non-explosive liquid stove polish can be made, but if no liquid stove polish is used there is no danger of accidentally getting hold of the explosive kind.

The same danger lies in liquid stove polish that exists in mushrooms, you are too apt to find out the fatal kind when it is too late.

WANTED CAR TO MATCH LEAD PENCIL.

"It is surprising," states C. A. Benjamin, vice-president and general manger of the Aerocar Company, "what a large demand there is this season for bright colors in the finish of automobiles. Instead of the more conservative darker shades many are ordering special finishes. These are varied as tastes in general. By the time that the present season's output is all in use, the main thoroughfares in our cities may resemble a long variegated flower-bed.

"To illustrate the extent to which this desire has grown, we recently received a bright purple lead pencil about three inches long, with the specification that the car was to be finished in that particular tint."—*Automobile Magazine.*

We are led to wonder if the pencil received by Mr. Benjamin was the popular Dixon Anglo-Saxon Pencil, in purple finish. While the shade of purple of Dixon's Anglo-Saxon would hardly be described as bright (it is more of the royal hue), it would seem to us to be a dignified, pleasing color selection for the motor car.

DIXON'S GRAPHITE PRODUCTIONS

FOR STREET RAILWAYS AND MANUFACTURERS,

Also Special Illustrations and Descriptive Articles on the Atlantic City Convention, American Street and Interurban Railway Association.

ATLANTIC CITY—WINTER AND SUMMER OUTINGS BY THE SEA.*

In the olden times, 'tis said, every feudal baron welcomed the stranger to his castle and the pilgrim to his fireside; he listened with delight to the tale of the traveler and the song of the troubadour. The barons and bards, pilgrims and poets, made their entrance and their exit a thousand years ago, and since their day the centuries have wrought many changes. The world is not what it was, but though the times have changed, mankind has not changed his nature. He still has the same desire for novelty, the same love of story, the same fondness for pleasure.

Attend then, worthy friends, if you will, while I, a stranger and traveler, tell of a delightful place whereunto I have been, and show unto you some pictures of the greatest and fairest of the world's watering places.

Sir Oracle, another pilgrim who preceded me to this place of pleasure, homeward bound, was benighted, and craved a shelter at my hands, promising that this courtesy he would repay with some story of the wonderful city which he had visited. In my veins there flows no blood of barons; howbeit, in imitation of the cavaliers of old, I feasted Sir Oracle at my humble board and seated him at my fireside. Then remembering his promise, and mindful of my hospitality, out of the fulness of his heart he thus spake: "Atlantic City! Place of Pleasure! Haven of Rest! Mecca of the Tourist! Delight of the Pilgrim! Abode of Fashion! Paradise of the Summer Girl! Home of the Neglige Shirt! Age cannot wither nor custom stale thine infinite variety! Paeans of praise can add naught to the glory that surrounds thee, thou Queen of the Coast." Again he was silent, and though I waited long, 'twas all he said.

Since then I have been to Atlantic City, and for thee, worthy listener, who, perchance, hath never been there, this panorama of pen pictures and camera sketches hath been prepared, with the confident expectation that the succeeding season of outing will find thee there among the thousands, enjoying to the full the beauties and pleasures of that unique resort. Though as yet a stranger to the place, thou mayst profit by my story, and, the while believing, may say to thy friend, in the language of Scotland's bard, "I cannot say how the truth may be; I tell the tale as 'twas told to me."

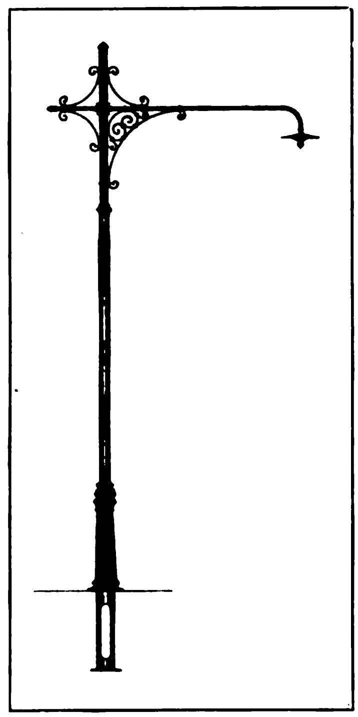
Be assured, I would not forestall thy good opinion of Atlantic City by offering thee pictures and sketches that are too highly colored. Briefly and frankly, my only hope is that, having heard my story and seen my play, thou mayst say, as Nick Bottom, the weaver, said to good master Cobweb, the fairy, "I shall desire more acquaintance of thee"—thou Jersey island fair, with the wine of life in thy pleasant air.

*Copyright Introductory To:—Heston's Hand Book of Atlantic City. By A. M. HESTON, Author and Publisher.

THIS IS AN ELMER P. MORRIS COMPANY'S POLE.

"Just Painted With Dixon's Olive Green."

Did you see the "Morris poles" along the Steel Pier at the Street Railway Convention, Atlantic City? These poles were from the regular stock of the Elmer P. Morris Company, No. 72 Trinity Place, New York City, and is but one of the types of hundreds of their plain and ornamental poles for carrying light and power. The "Morris Poles" on the Steel Pier carried the current for power and light the entire length of the pier



(1,600 feet oceanward) for use of the large number of exhibitors. In keeping with good architectural effects, the "Morris Poles" were painted with Dixon's Olive Green and each pole was properly labeled "JUST PAINTED FOR PROTECTION AND EFFECT, with DIXON'S OLIVE GREEN." Street Railway Officials are asked to keep in mind two good ones —"MORRIS POLES," and "DIXON'S SILICA-GRAPHITE PAINT."

TO CATCH A CAR QUICKLY.

"Sir, can you tell me how you catch a car quickly here for So-and-so?" asked a lady of a gentleman who stood at the corner leaning on his shovel and lighting his pipe.

"Sure, mum, and I always runs along wid it a little ways, then grabs the handle wid me right hand and jumps."

—*Tri-State Tourist.*

DIXON'S graphite publications will be sent free upon request.

DIXON'S GRAPHITE LINE
QUALITY STREET
1827 1907
Pass Hon. F. P. Stoy, Mayor
ON THE PRIVATE CAR "DIXON"
DURING THE AMERICAN STREET AND INTER-URBAN RAILWAY CONVENTION, ATLANTIC CITY.
OCTOBER 14TH-18TH 1907.
DIXON'S GRAPHITE EXHIBIT.
CORNER SPACES—END OF ARCADE—STEEL PIER.
JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N.J.
DIXON TRADE MARK (OVER) Charles H. Spotts
MANAGER, DIXON'S GRAPHITE EXHIBIT.

NOT TRANSFERABLE. NOT COLLECTABLE.

THIS PASS TO GOOD ACQUAINTANCE WITH DIXON'S GRAPHITE LINE. QUALITY STREET THE ONLY LINE OPERATED. EIGHTY YEARS SMOOTH RUNNING WITH DIXON'S GRAPHITE PRODUCTS. THE PERSON ACCEPTING AND USING THIS PASS IS ENTITLED TO ALL THE ECONOMICAL BENEFITS TO BE DERIVED FROM THE USE OF DIXON'S GRAPHITE LUBRICANTS, PAINT, GREASES, CRUCIBLES, PENCILS, MOTOR BRUSHES AND SPECIAL GRAPHITE PRODUCTS FOR STREET RAILWAYS AND MANUFACTURERS.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, U. S. A.

DIXON'S BLUE PASS THAT DROVE AWAY THE BLUES.

All street railway officials, exhibitors and the many citizen friends at Atlantic City, received from the Joseph Dixon Crucible Company a cordial invitation to visit Dixon's Graphite Exhibit, and a pass on the private car "Dixon."

The above illustration of Dixon's Blue Pass carries the name of the Hon. F. P. Stoy, Mayor of Atlantic City, who was a frequent visitor to Dixon's Graphite Exhibit. Mayor Stoy did not content himself with simply the formal address of welcome delivered at the opening of the Association, but each day visited the Pier and personally observed that all proper precautions were being taken for the policing, and fire protection of the exhibitors' booths.

Dixon's Blue Pass was mailed to Convention visitors registered at the different hotels and was also given out at the entrance to Dixon's Graphite Exhibit by a small colored boy in the uniform of a conductor.

The private car "DIXON" was one of the old fashioned New York City horse cars, which has seen forty years' service on the streets of New York. One side of the interior of the car was tastefully decorated with Dixon's colored lithographed panels advertising Dixon's American Graphite Pencils; Dixon's Silica-Graphite Paint and Dixon's American Ticonderoga Flake Graphite Lubricants. On the opposite side of the car were four six foot mirrors of different convexes which distorted the figure of the person standing or sitting before the mirrors. The mirror galleries, or to use the popular phrase, "laughing galleries," at Street Railway Parks, have furnished more amusement for the young and old than any other attraction, but at Dixon's Graphite Exhibit the amusement was intensified by the good effect secured by sitting before the mirrors as well as standing.

A TIP:—The managers of amusements at Street Railway Parks can increase the fun for their patrons by arranging seats before the mirrors.

Dixon's Graphite Exhibit was visited daily by thousands of street railway officials, exhibitors and visitors from all over the world. Dixon's visitors' cards showed callers from the Hawaiian Islands; Denmark; England; France; Porto Rico; Canada; Mexico and every state of the Union.

"ALL WELCOME" was the sign at the entrance to Dixon's Graphite Exhibit, and those of our friends who were not at Atlantic City, will understand from the above that we were there with a hearty welcome for all visitors.

THOUSANDS AMUSED BY DIXON EXHIBIT

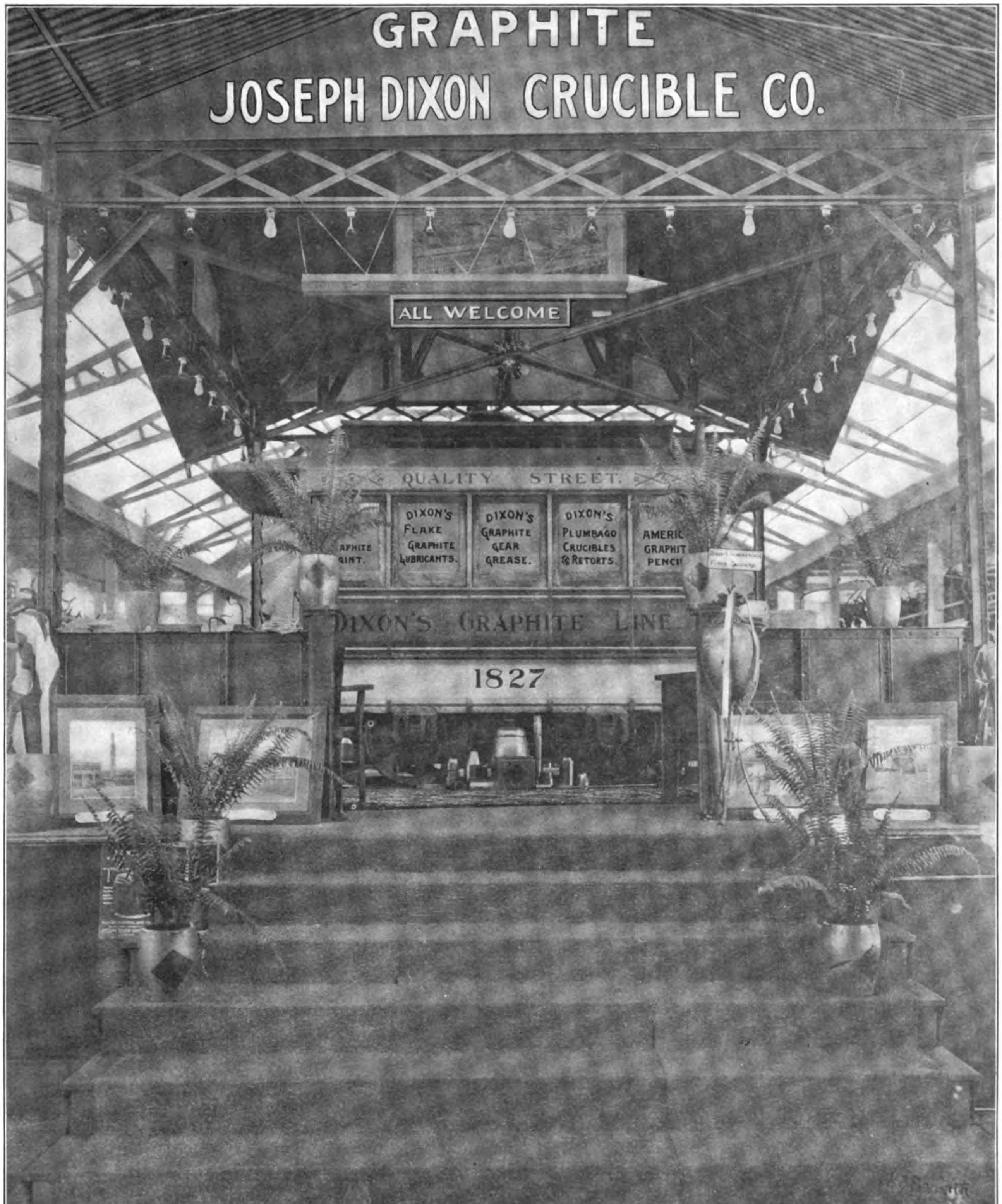
Ancient Horse Car With Twisted Mirrors Feature of Convention.

Thousands of visitors at the convention exhibit of the Street Railway Association at the Steel Pier are amused by the old horse car of New York exhibited by the Joseph Dixon Crucible Company. The car was made by George Stephenson, and has withstood forty years of continual service.

Manager Charles H. Spotts, who designed the exhibit, has placed twisted mirrors in the interior of the car, and if one can't see himself as others see him, he can at least see himself as he would not like to be seen. The mirrors are the cause of much merriment on the part of the visitors.

The Dixon Company has always had some unique feature at their exhibits. At the Columbus convention it was a large paint can, lined with mirrors. While the company had an output of 100,000 000 pencils of 1,100 styles last year, the pencils are but a small portion of their products, others being crucibles, lubricants, and paint for iron work for the prevention of rust and corrosion.

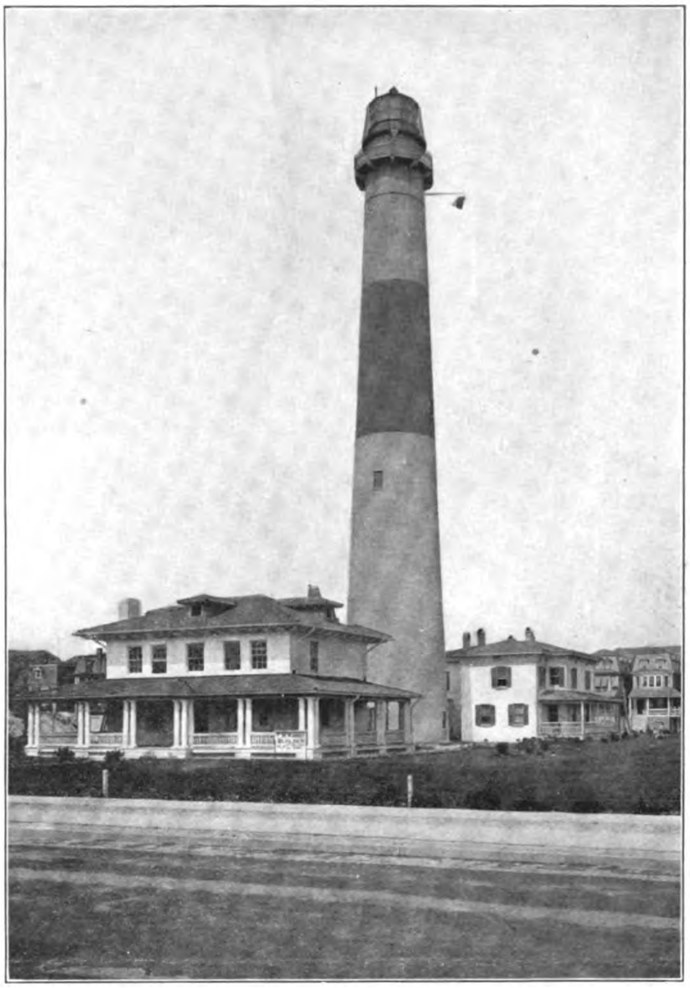
Atlantic Review, Oct. 16, 07.



DIXON'S GRAPHITE EXHIBIT,

American Street and Interurban Railway Convention, Steel Pier, Atlantic City.

Dixon's Portable Steel Exhibition Building Shown in Illustration, is Protected with Dixon's Silica-Graphite Paint. The Old Horse Car, Relic of the Earlier Types of Rapid Transit, was Inspected Daily by Thousands of Railway Officials and Visitors. Moral: Dixon's Graphite Products for Street Railways and Manufacturers are Old Timers Kept Up-to-Date. Established 1827, Leading the World in 1907.



ABSECON UNITED STATES LIGHTHOUSE, ATLANTIC CITY, N. J.

The lighthouse is an object of much interest at the northeastern end of the island, the house of the keeper facing Rhode Island Avenue. The height of the tower is 159 feet from base to focal plane, and 167 feet above the sea level. The ascent is by 228 spiral steps to the watch room and 12 steps from the watch room to the lantern. The lamp is what is known as Funck's mineral-oil lamp, with fixed white light and Fresnel lens of the first order, and from the deck of a vessel can be distinguished from other lights at a distance of nineteen miles. The lighthouse is open to visitors from 10 A. M. to 12 M., the year around, Sundays excepted.

Atlantic City has today one of the best lighthouses in the country, which, with later improvements, cost upward of $50,000. The tower of the lighthouse was first illuminated in January 1857.

Formerly the lighthouse was a perpetual snare for birds. In their spring and fall migration birds of all descriptions, from the wild goose to the bobolink, were attracted at night by the light in the tower, and dashed against it with such force as to kill about one-third of their number. The others, maimed and bleeding, fluttered against the screen outside until taken in by the humane keeper. The live birds were kept until morning in perforated paste board boxes, and then released. As many as 481 birds, dead or alive, were thus entrapped in a single night in the manner described. Since the use of electric lights for street illumination in Atlantic City, the birds have not been attracted by the light in the lighthouse tower, and very few are now killed or maimed in the manner stated.—*Heston's Hand-Book.*

The Absecon Lighthouse is of brick construction, 598,634 bricks having been put into its tower. The outer brick surface of the lighthouse is kept well painted in two distinct shades—yellow and black—which shades are now recognized by lighthouse and railway signal experts as being the most distinct for the longest distance.

The first and third sections of the lighthouse are in yellow paint, divided by the second section painted for years with Dixon's Silica-Graphite Paint, Black, which successfully resists the full exposure to sea air.

GALVANIZED IRON COVERED BUILDING,

1600 Feet Out in the Ocean.

In making the trip to the end of Atlantic City's Steel Pier, after passing the Ball Room and Music Hall, comes the "Ocean View Shelter" at the extreme end of the pier, 1600 ft. in the ocean. This delightful place is the Mecca of the student and sweethearts. "Swept by ocean breezes" to the greatest possible extent, this shelter is naturally the most exposed building on the Steel Pier. The shelter is covered with a galvanized, corrugated iron roof. One of the very hardest surfaces on which to make paint stick is on galvanized iron.

Space does not allow of an explanation of the causes of paints blistering and peeling on galvanized iron. The "proven remedy" is all we will indicate.

Dixon's Silica-Graphite Paint sticks to galvanized iron. Dixon's Natural Color has stuck to the roof of the pier shelter for three and a half years, and there's not a blister or broken place in the paint coating. Galvanized iron and sea air are two severe paint conditions, but any of the four Dixon Colors will prove serviceable for the purpose.

FLAT, BUT NOT A WHEEL.

"Better get that flat wheel fixed," remarked a passenger.

"Flat wheel nothing. That's Bill, the motorman, stamping his foot to keep it from going to sleep," returned the wise conductor.—*Tri-State Tourist.*

—*Courtesy Street Railway Journal.*

ATLANTIC CITY'S FAMOUS BOARDWALK AND STEEL PIER

Extending 1600 Feet Oceanward. Place of Meetings and Exhibits, October Convention

AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.

NEW YORK ELECTRIC FOUNTAIN COMPANY'S ELECTRIC-LUMINOUS AND PORTABLE FOUNTAIN.

Inventors and electrical experts continue to assert that electrical development is yet in its infancy.

Visitors at the Atlantic City Convention of the American Street and Interurban Railway Association saw many different examples of electrical development up-to-date, in its use for lighting, transmission of power for manufacturers' purposes, car and locomotive operation, and for communication between the land and ships on the sea, hundreds of miles distant.

An electrical novelty that was admired by all, was the portable fountains at Dixon's Graphite Exhibit. These electric-luminous fountains rivalled in interest aroused, the twelve ton turbines in operation at the magnificent display of the General Electric Company.

The New York Electric Fountain Company, O. F. Battalia, General Manager, 116 West 39th Street, New York City, who manufactured the portable fountains displayed, are constructors of patented designs of many types of small and large electric fountains for street railway parks, hotels, theatres and private homes.

The two fountains at Dixon's Graphite Exhibit were run continuously fourteen hours daily for the five days of the convention, at the low cost of 56 cents for total current consumed in the lighting and operation of the two fountains.

A brief description of these new portable electric fountains will be of interest to all readers of GRAPHITE. The height of the fountain is about 22 inches, and at base about 12 inches wide. The construction is very simple, consisting of a small electrical motor and a centrifugal pump, the latter placed in the interior of a basin and connected directly to the motor shaft.

The pump gets the water directly from the basin and conveys it through the pipes and a multiplicity of small nozzles, thus producing cascades. The water, falling upon the dome, returns to the basin and thence again to the pump. Once the fountains are filled, it is not necessary to refill until the water diminishes by the process of evaporation.

In the basin may be placed beside water, perfume or colored water or any disinfectant or thin fluid. To produce the play of the fountain and its fascinating effects, it is only necessary to attach the wire to the circuit and turn on the switch.

The dome is illuminated by an incandescent lamp, and revolves by means of a jet of water driven against flanges on the underside of the rim of the dome. In this way the most beautiful colored and prismatic effects are produced.

A thing of beauty is a joy forever and the electric-luminous fountains proved one of the most attractive features of the Atlantic City Convention.

SEA BREEZES.

Good-bye to pain and care! I take
Mine ease to-day;
Here, where the sunny waters break
And ripples this keen breeze, I shake
All burdens from the heart, all weary thoughts away.

Ha! like a kind hand on my brow
Comes this fond breeze,
Cooling its dull and feverish glow;
While through my being seems to flow
The breath of a new life—the healing of the seas.

—WHITTIER.

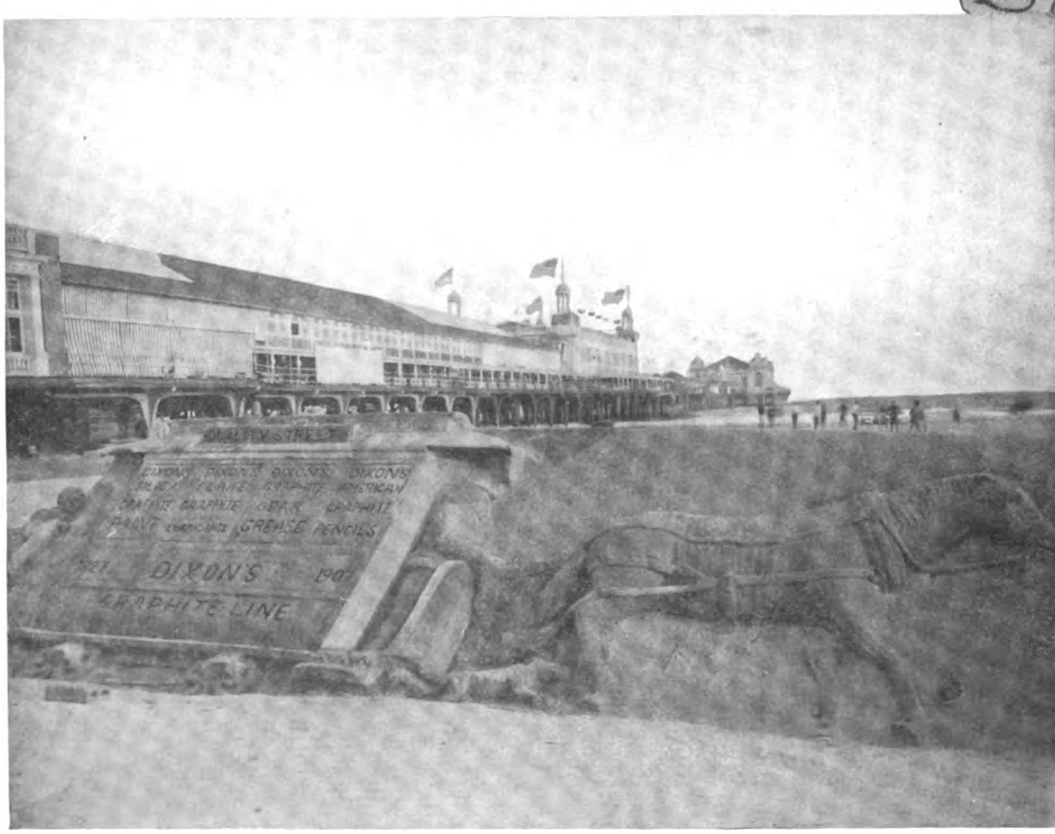
Dixon's Gra
and Sanc

Atlantic City
American Street
Railway A

October 14th

DIXON IN THE SAND AT ALTANTIC CITY, N. J.

Among the multitude of attractions at Atlantic City none is more popular than the figures in the sand along the ocean side of the famous boardwalk. Everyone watches with interest the clever modeling of the sand artists. The Joseph Dixon Crucible Company secured the services of the famous sand artist, Mr. La Rue Yost, who models at the entrance to the steel pier, to illustrate by interesting figures and writings in the sand, the adaptability of Dixon's Graphite Products for street railway and manufacturers' use.



SPECIAL FEATURES, ETC., D

Dixon's Portable Structural Steel E
tection and decoration with Dixon's S
and blue electric lights and American f
concern." Flags of all Nations waved
on the peak of the exhibit booth,
American Ticonderoga Flake Graphite i
purposes." Demonstrations were give
Products adapted to the use of street
representatives in attendance, reading f
Condit, J. J. Tucker, C. H. Spotts an

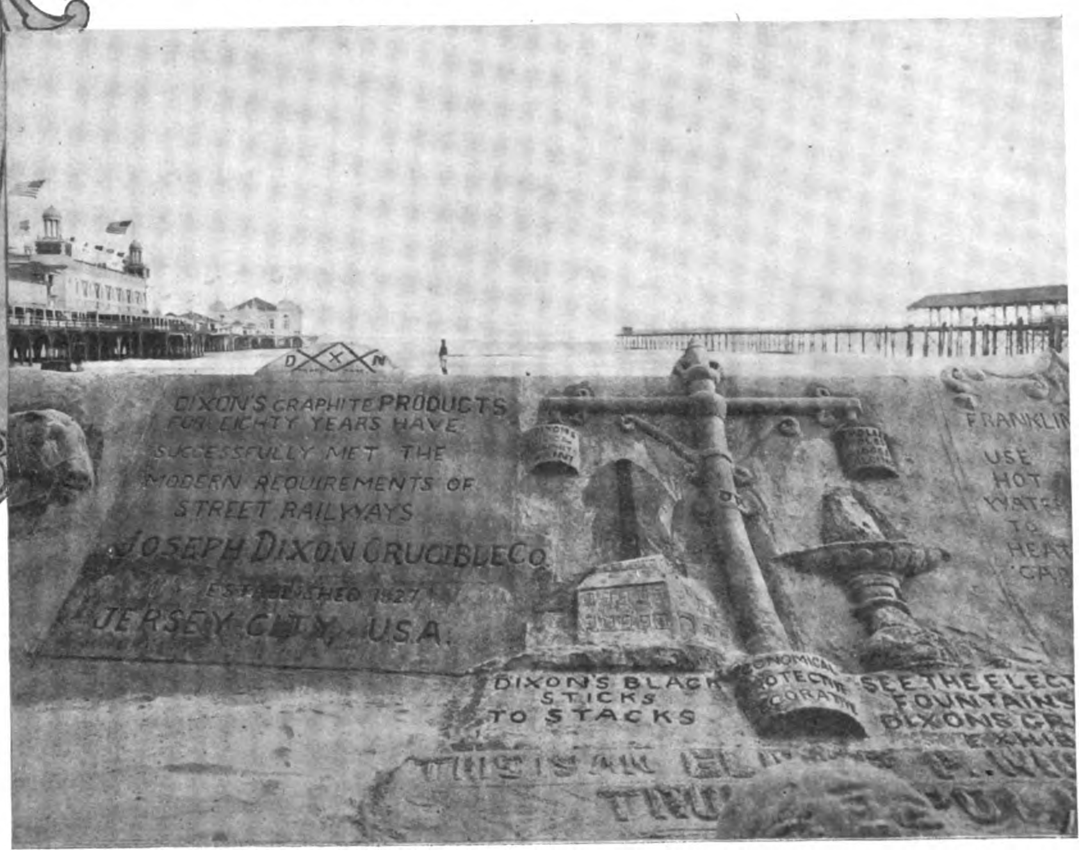
phite Exhibit
d Figures,
Convention,
and Interurban
ssociation,
to 18th, 1907.

DIXON'S GRAPHITE EXHIBIT.

Exhibition Booth was painted for pro- Silica-Graphite Paint. The red, white flags indicated that Dixon was a "home over a large illuminated lubricant can which flashed the message—"Dixon's is used in all countries for lubricating en of the merits of Dixon's Graphite railways and manufacturers. Dixon's from left to right: L. H. Snyder, J. A. d **N. J. Rowan.**

DIXON'S SAND FIGURES THE MOST ATTRACTIVE.

The original designs and the perfect modelings of Dixon's sand figures in the sand, were pronounced by convention visitors and citizens of Atlantic City, as being the most unique of sand displays. The entertainment afforded by Dixon's figures and hand writings in the sand, impressed on the minds of the observers that for eighty years Dixon's Graphite Products have lead the world. This sand modeling will soon be destroyed, but the name of Dixon will always be a quality foot print in the sand of time.

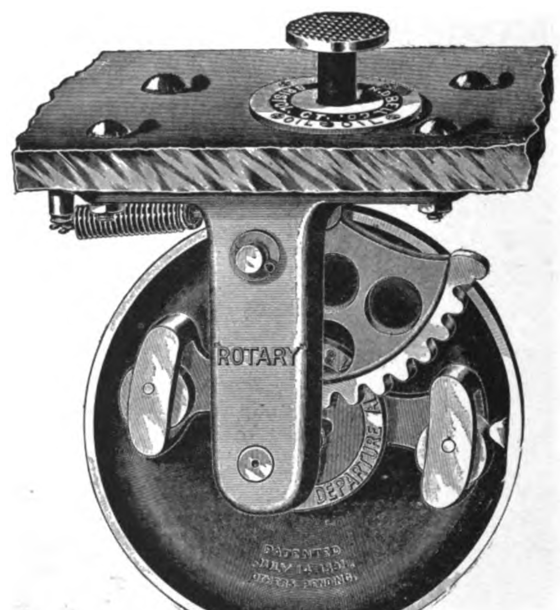


IN THE FOREGROUND IS ATLANTIC CITY'S FAMOUS BOARDWALK; THE FIRST PIER IS TILYOU'S STEEPLECHASE AMUSEMENT HALL AND OCEAN THEATRE; THE SECOND PIER IS THE MAGNIFICENT "STEEL PIER" WHERE WAS DISPLAYED THE SPLENDID COLLECTION OF APPLIANCES OF THE AMERICAN STREET AND INTERURBAN RAILWAY MANUFACTURERS ASSOCIATION.

CHELSEA HOTEL, ATLANTIC CITY, N. J.

The Chelsea is one of the most noted hotels. It faces the boardwalk in the new Chelsea section, which is Atlantic City's modern high class home district. The Chelsea adds largely to the capacity of Atlantic City hotels to care for 300,000 guests daily.

The Chelsea is somewhat away from the group of hotels but its situation has won many patrons desiring the quietness and full ocean view, yet in close proximity to the cosmopolitan life of Atlantic City. This magnificent hotel has a roof of very pleasing architectural lines. The metal shingles are protected from full exposure to the paint destroyers and rust producers—sun, rain, ice and sea air, with Dixon's Dark Red, which for years has looked well and worn well on the Chelsea Hotel.



DID YOU HEAR IT RING?

The clear continuous alarm gong at the old horse car on Dixon's Graphite Exhibit, was one of the rotary gongs of The New Departure Manufacturing Company of Bristol, Conn. Its commercial purpose is for use on trolley cars, ambulances and patrols to warn pedestrians, but at Dixon's Graphite Exhibit it carried a message of invitation to enjoy a trip, free of danger on Dixon's Graphite Line.

THE SEA.

Thou art so grand, so wonderful, O Sea!
In all thy depths and whispering mystery—
Forever chafing 'gainst thy destiny,
Forever telling o'er thy tale to me.
Thou art the pulsing, throbbing heart of earth—
Throbbing in chaos, ere the world had birth—
Still art thou heaving, surging 'gainst her girth.

Thou and the earth, twin-sisters, as they say,
In the old prime were fashioned in one day;
And therefore thou delightest evermore
With her to lie and play
The Summer hours away,
Curling thy loving ripples upon her quiet shore.

Sunlight and moonlight minister to thee—
O'er the broad circle of the shoreless sea
Heaven's two great lights forever set and rise;
While the round vault above,
In vast and silent love,
Is gazing down upon thee with his hundred eyes.

Sometimes thou liftest up thine hands on high
Into the tempest-cloud that blurs the sky,
Holding rough dalliance with the fitful blast,
Whose stiff breath, whistling shrill,
Pierces, with deadly chill,
The wet crew feebly clinging to the shattered mast.

Foam white along the border of the shore
Thine onward leaping billows plunge and roar;
While o'er the pebbly ridges slowly glide
Cloaked figures dim and gray
Through the thick mist of spray—
Watchers for some struck vessel in the boiling tide.

All night thou utterest forth thy solemn moan,
Counting the weary minutes all alone;
Then in the morning thou dost calmly lie,
Deep-blue, ere yet the sun
His day-work hath begun
Under the opening windows of the golden sky.

—Lord Byron, in *Childe Harold.*

TABULATED FACTS ABOUT ATLANTIC CITY.

Permanent population (census 1905)	40,000 people
Average August population one day (estimated)	300,000 people
Length of ocean-front city boardwalk	4½ miles
Length of water pipes in use	78 miles
Length of iron sewer	42 miles
Length of longest ocean pier	2,804 feet
Number of churches	29
Number of Fire Companies	14
Distance from Atlantic City to Mainland	5½ miles
Erection of Boardwalk begun	April 24, 1896
Boardwalk dedicated to public use	July 8, 1896
First train to Atlantic City	July 1, 1854
First train on Pennsylvania system via Delaware River Bridge to Atlantic City	April 19, 1896
Hotels and Boarding Houses	922
Number of Newspapers (3 daily and 5 weekly)	8
Value of real estate	$92,000,000
Number of Theatres	5
Number of Piers	4
Height of Lighthouse	167 feet
Distance visible at sea	19 miles

GALEN HALL, ATLANTIC CITY, N. J.

The Most Elegant Health Resort in the United States.

This magnificent fireproof structure is delightfully situated on wide avenues within two blocks of the Beach. In selecting the very best class of building materials for Galen Hall, Dixon's Silica-Graphite Paint was used for painting all steel work, fire escapes and roof surfaces.

POWER PLANT OF THE STEEL PIER, ATLANTIC CITY, N. J.

Alongside the Jackson Hotel, Virginia Avenue.

The track exhibits of private and interurban cars and electric locomotives at the Atlantic City Convention, were in the vacant lots adjoining the Hotel Jackson, Virginia Avenue and the Boardwalk. Thousands of visitors to the track exhibits, noticed the "hand signs" in the sand and grass, pointing to the smoke-stack of the power plant of the steel pier. An immense sign gave the information that "DIXON'S BLACK HAS STUCK TO THIS STACK FOR THREE AND A HALF YEARS." "Not a blister," not a crack," "sticking perfectly", "holds its color," "mighty good paint," "going to get some of Dixon's Black," were a few of the comments heard. This is but one of the many thousands of stacks on which Dixon's Silica-Graphite Paint, Black, is sticking with a grip not to be shaken off for a long time by heat and weather. Dixon's Black won't last forever, but it will give a better appearance and last longer than any other stack paint we know of in over forty years' experience as paint makers.

Mr. A. H. Franck, Chief Engineer, Steel Pier, stated that Dixon's Black was the only paint that had successfully resisted for any lengthy period of time, the very severe conditions of their stack—high degree of heat in combination with sea air. "The proof of the pudding is in the eating." Try Dixon's Black on your stack.

THIS IS ON THE FIREMEN.

A man applied for a position as motorman on the trolley cars the other day, and after being shown how to operate a car was sent out alone with the instructions to stop his car whenever he saw any fire apparatus coming down the street. In the afternoon he was sending his car as rapidly as possible down Washington Street, Boston, when the warning screech of an engine whistle caused him to stop his car. He waited until the engine, hose wagon and chemical had passed and then started up his car again. Just as he got under headway a ladder truck swerved around the corner and ran into the trolley car. At the investigation the motorman was called up before the officials and asked why he had not obeyed instructions and stopped his car. "Sure, but I did not know that that gang of drunken painters with their ladders were a part of the fire department," he replied.

He still has his position.—*Lowell Mail.*

DIXON'S graphite publications sent free upon request.

Manager of Great Dixon's Crucible Company's Exhibit on Steel Pier Favors Resort for Next Meeting Place—Praises Hotels and Steel Pier Facilities.

"Your resort is by long odds the greatest convention city I have ever visited It is ideal in every way. The hotels are unexcelled, the railroad facilities unsurpassed, and the exhibition hall on the Steel Pier without a superior," enthusiastically declared Charles Spotts, who is in charge of the wonderful exhibit of the Joseph Dixon Crucible Company, to a representative of The Press yesterday.

Mayor Stoy has afforded us the best welcome of any convention ever held by the American and Interurban Railway Manufacturers' Association and affiliated bodies. He has spent several hours with us each day and in my opinion this year's gathering is the greatest in the history of the association.

The exhibit is by far in advance of all others and the arrangements on the Steel Pier are perfect. Never has the exhibition material been handled with as good results or with a better system than this year. Hundreds of tons of machinery were handled with ease by the Eldridge Company and although nearly all the material was late in arriving, Eldridge was equal to the occasion and everything was in good shape when the time arrived to open.

Mr. Spotts has visited practically every city in the country and he is positive in the assertion that Atlantic City is the best ever. The exhibit of the Dixon Crucible Company is one of the most unique and popular on the Steel Pier, and Mr. Spotts is kept busy responding to the congratulations of his many friends. Yesterday, more than fifty thousand people visited the Dixon exhibit, where the ladies were given thimbles as souvenirs and small dice cans were handed out to the men.

The display occupied considerable space and situated upon a high platform is a unique trolley car which was manufactured by John B. Stevenson many years ago.

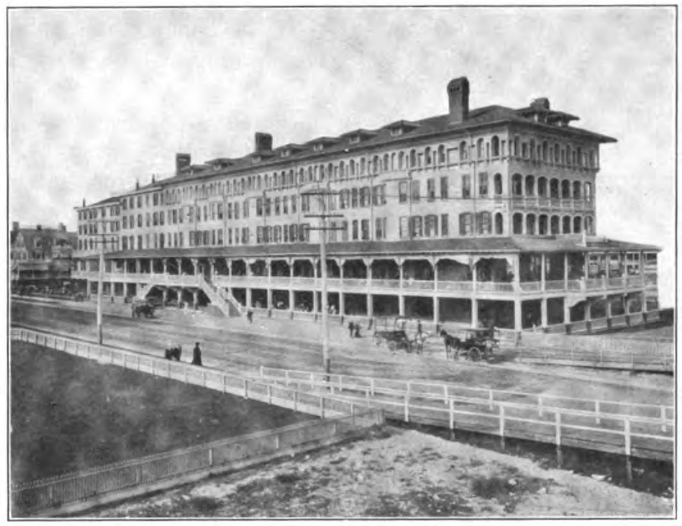
On each side of the platform are beautiful electric water fountains of the New York Electric Fountain Co., and many novel features in the designing line decorate the booth.

The interior of the car is fitted up with humorous mirrors which create a tempest of merriment. Each visitor is given a "pass" on the Dixon trolley line and an interested crowd is always around the novel exhibition.

Atlantic City Daily Press
Oct. 16th 1907

THE JOSEPH DIXON CRUCIBLE COMPANY, of Jersey City, N. J., was somewhat up in the air; that is, its booth was on a platform some four or five feet high in the center of the pier and was accessible by a short flight of stairs at the top of which one encountered an old horse-car recently taken from service, which bore well-known Dixon signs. To this car a pass was given by the representatives of the company. The Dixon graphite products displayed consisted of graphite brushes, graphite greases and Dixon's silica graphite paints. Ferns in Dixon graphite pots were used to decorate the booth. The decorations were in red, white and blue, a goodly number of lamps of these colors being used for illumination. Pencils, dice pails and aluminum thimbles were distributed as souvenirs. Chas. H. Spotts, Neville J. Rowand, John J. Tucker, L. H. Snyder, J. H. Condit and Ralph R. Belleville represented the company.

Street Railway Journal



HADDON HALL, ATLANTIC CITY, N. J.

Famous among 922 licensed hotels and boarding houses, Haddon Hall is one of Atlantic City's most impressive hotels. Its dignified exterior and comfortable interior, has for a number of years attracted visitors from all parts of the world. On attractive North Carolina Avenue, facing the board walk with a clear view of the ocean, the hotel has a setting enjoyed by few Atlantic City hotels. The large grass plot between the hotel and the boardwalk is in pleasing contrast to the wide expanse of sand.

From the boardwalk, the roofs of the porches and building have the appearance of slate and the effect with the light body color of the hotel is very pleasing. The roofs are of ornamental metal shingles, painted for years for protection and decoration with Dixon's Natural Color. Dixon's Silica-Graphite Paint is properly applied by Stephen S. Crane, Contracting Painter, Atlantic City, who has the painting of Haddon Hall and the majority of the ocean front hotels.

Mr. Crane uses Dixon's Silica-Graphite Paint exclusively for roofs, fire escapes and structural painting, and is a firm advocate of Dixon's for protection of metal surfaces exposed to the destructive action of sea air.

MOURNING ETIQUETTE.

Lois (aged five—proud of her first mourning): No thank you, auntie, I do not want the colored crayons. I feel like using only black pencils since my grandpa died.

—*Harper's Bazar.*

A NEW PRODUCT FROM AN OLD HOUSE.

Joseph Dixon, the founder of the Joseph Dixon Crucible Company, began in a small way the manufacture of stove polish in the year 1827. This polish was put up in bar form quite similar to that still sold, and was called "Carburet of Iron." The name was given under the early misapprehension that graphite was a compound of carbon and iron. "Carburet of Iron" is still retained in the title because of its first association with the product.

The passing years have brought their changes, and to-day all that makes for speed and convenience receives first consideration. As appropriate to the spirit of the times, the Dixon Company has prepared and placed on the market the old reliable "Carburet of Iron" in a new and modern form. The virtues of the first Dixon polish—its brilliancy, its durability—have been retained, but the new powdered form allows of quick and easy application. It is only necessary to perforate the top of the box and sift as much of the powder as desired on a damp cloth; or a paste may be made by mixing some of the powder with a little water.

The cut that appears above shows the exact size of the Dixon box. The label is yellow and black, the letters appearing in yellow. As will be seen from the illustration, the new Dixon Powdered Stove Polish is put up in a generous size package, and an additional economical advantage lies in the fact that the Dixon powder is all *polish*—there is no clay to add bulk and weight.

Another feature that will appeal to the housewife is the Universal Coupons that are given with Dixon's Powdered Stove Polish. These coupons have real value and are not to be confused with the multitude of questionable and short lived premium schemes. Universal Coupons are backed by a big organization and are given by a large number of concerns that market a variety of standard goods. Knickerbocker Chocolate Co., chocolate and cocoa; Potter and Wrightington, "Old Grist Mill" products; Whittemore Bros. & Co., shoe polishes; Wrigley Mfg. Co., scouring soap; and many other prominent concerns pack Universal Coupons with their goods.

The Dixon Company has the sole right to issue Universal Coupons with stove polish and Dixon's is therefore the only stove polish with which Universal Coupons may be secured.

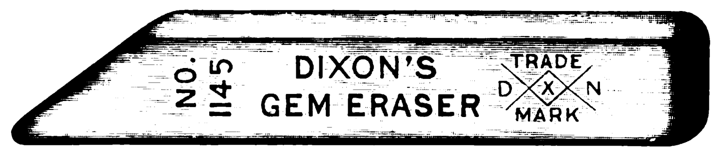
Since the Coupons are given with a geat many different household necessities it becomes easy to accumulate quite a number in a comparatively short time.

If you have not used this newest Dixon product we would suggest that you get a box from your grocer and try it.

DIXON'S "GEM" ERASIVE RUBBERS.

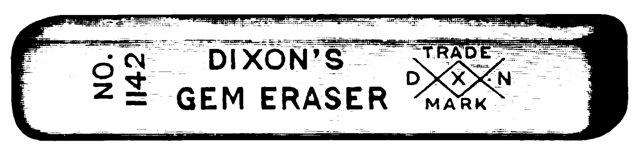
Something New.

Almost everybody has occasion to use a pencil, and so it follows that almost everybody has use for an erasive rubber. While some may prefer to combine the two and use a rubber tipped pencil, this is not the best practise. The rubber tip will serve for an emergency, but it soon wears out if used to any extent, and if carried in the pocket readily becomes soiled.



Beveled End Style.

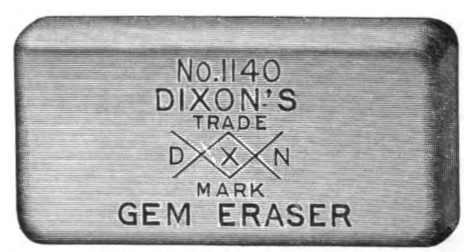
The new Dixon "Gem" Eraser is flawless—a soft, flexible eraser that quickly removes pencil marks without the slightest injury to the writing or drawing surface. Its pliable, velvety texture and its freedom from gritty constituents make it impossible for Dixon's "Gem" to dig into paper. Before doing so the rubber itself will yield.



Bar Style.

All pencil marks, however, are quickly erased, for the natural moisture and absence of surface glaze cause the "Gem" to closely hug the paper and remove all marks from its surface.

"Gem" erasers are pinkish red in color, but do not leave the faintest trace of color on any surface; perhaps you have seen some kinds that did.



Block Style.

These erasers are the result of considerable experimenting in the light of long experience. The finished product is worked up from the very best raw material, and as all the processes are completed in our own plant we know that nothing is slighted.

We are rather proud of this latest achievement in erasive rubbers. We are confident you will be pleased with them too. They are well adapted to the most exacting requirements.

As will be seen from the illustrations, "Gem" erasers are made in three styles: block, bar and beveled end.

GENESIS OF GRAPHITE.

Two theories as to the formation of graphite deposits are discussed in the *Bull. Imp. Inst., Vol.* 4, No. 4, 1906. In some cases it is thought to be formed by the action of intense heat on coal or other carbonaceous material, such heat being the result of the presence of igneous intrusive rock in the immediate neighborhood. Graphite formed in this way is compact, being the so called amorphous graphite, and includes the dull and earthy varieties and certain special forms which present a close resemblance to anthracite. Deposits of graphite formed by this compact metamorphism are those in the Alps iron and manganese, the oxides of which are often found in decomposed rock associated with deposits of graphite. He also thinks that cyanogen compounds may have played some part in the formation of a few graphite deposits.

Graphite of secondary origin may be either flaky, prismatic, fibrous or compact in structure. The coarser forms of graphite occur where the deposits have not been disturbed by earth movement. Although the secondary graphite deposits are usually of better quality, the irregularity of their mode of occurrence renders systematic mining of them well nigh impossible.—*Engineering and Mining Journal.*

THE LITTLE CHAP'S FAITH.

By Louis E. Thayer.

It's comfort to me in life's battle,
 When the conflict seems all going wrong,
When I seem to loose every ambition
 And the current of life grows too strong,
To think that the dusk ends the warfare,
 That the worry is done for the night;
And the little chap there at the window,
 Believes that his daddy's all right.

In the heat of the day and the hurry,
 I'm prompted so often to pause,
While my mind strays away from the striving,
 Away from the noise and applause,
The cheers may be meant for some other,
 Perhaps I have lost in the fight;
But the little chap waits at the window,
 Believing his daddy's all right.

I can laugh at the downfalls and failure,
 I can smile in the trial and the pain,
I feel that in spite of the errors,
 The struggle has not been in vain
If Fortune will only retain me
 That comfort and solace at night,
When the little chap waits at the window,
 Believing his daddy's all right.

—*Denver Republican.*

One of the Dixon workers is visiting schools in Northern New York, interviewing school superintendents. "Where is Dixon's factory?" was asked. On being told the questioner exclaimed, "Oh yes, I visited it once,—no, I'm mistaken, it was a soap factory."

Possibly a Dixon employe would suggest soap at the close of a day's work.

BE THOROUGH.

Governor Hughes of New York pleads for thoroughness, he says:

"We have learned that nothing can be accomplished in a haphazard way. We have learned in industrial pursuits that we must have skilful or technical training, so that a man will know what is worth while. We must also learn that the business of government is not to be conducted in a haphazard way; that men are not to be put in office simply for the purpose of drawing their salaries or being agreeable to their friends, so that they can grant a special favor and then put up a bluff at the next election.

"We are to learn that the business of the government and the business of the States demands the best service that the State can procure, in order that the work shall be well and faithfully done, just as well and faithfully done as it is done in the bank or in the factory or upon the farm, and that the most careful attention must be given to little things, the little things of life which spell perfection when they are done in a proper manner.

"It means the absence of shiftlessness. It means making everything count for the State."

THE MAN WHO CHEATS HIS WORK.

An employer of thousands of men was asked what thing in all his large operations gave him the most concern. "The man who does a little less than is expected of him," was the reply. "He is the dangerous factor in all business. The absolute failure we readily discover and discharge, the 'almosts' escape detection for months and often for years, and they make our losses as well as our fears," and with a very serious smile he added, "The drip in business is worse than the leak."

It is a condition that is as old as human experience. Eighteen and a half centuries ago Seneca put it in these words: "Some portion of our time is taken from us by force; another portion is stolen from us; and another slips away. But the most disgraceful loss is that which arises from our own negligence and if thou wilt seriously observe, thou shalt perceive that a great part of life flits from those who do evil, a greater from those who do nothing, and the whole from those who do not accomplish the business which they think they are doing."

Thousands of men fancy they are fulfilling their duty to their employers and to their tasks by keeping hours and performing just enough to hold on to their positions. They have an idea that to do more would be to give larger service than their compensation required. They object to what they believe would be extra values. "The old man sha'nt get more than he's paying for," is the vernacular.

Possibly it never strikes these trimmers that in cheating their work they are doing double damage; they are injuring their employers much, but they are robbing themselves more; they are, in fact, losing everything in life that is worth while.

They fare worse than if they did nothing at all, for time with all its precious values slips entirely from them and leaves no substance or satisfaction.

Half doing soon brings undoing. It is the nine-tenths doing or the ninety-nine one-hundredths doing that bleeds business and saps character.—*Saturday Evening Post.*

A SAVING OF OIL, TIME AND TROUBLE.

A recent letter from an engineer who, like multitudes of others, finds Dixon's Flake Graphite a great aid to him, is reproduced below. As the writer did not indicate whether he wished his name used, we do not take the liberty of doing so.

HARRISBURG, Pa., Oct. 23, '07.

Joseph Dixon Crucible Co.,
Jersey City, N. J.

Dear Sirs:—In reply to yours of the 21st instant I want to say that I have found Dixon's Flake Graphite entirely satisfactory. For a full understanding of the case I must state that I am compelled to use an invalid chair. I had previously used oil but soon grew tired of being compelled to oil up almost every day; but since I use your graphite mixed with oil an oiling lasts from two to four weeks and the wear on the ball bearings seems to be decreased.

Yours truly, ______

MORAL VENTILATION.

The mental and moral atmosphere of a business, says the New York Mail, deserves ample consideration; it is a matter of great importance to the development of the individual.

A man who had been employed in an office where progressiveness and good feeling prevailed, left to take a position at a much higher salary with another concern. But he quickly learned that the spirit of the new place was not like that of the old one. Men quarreled with each other over trifles, the manager was gruff and overbearing, the conversation was either made up of criticising each other or of matters equally unwholesome. The man soon discovered that the additional salary was more than offset by the unrefining influences, and he was glad of an opportunity to return to his old position at his former salary.

Many men get started in the wrong kind of business atmosthere and do not always realize that there are places where things are very different and not appreciating this they do not make the effort to get into a better atmosphere or to purify the one they are in. Instead they spend a large portion of their lives under conditions as unwholesome as a closed room in summer.

When a man gets a "better offer" in salary, let him not fail to give attention to the moral atmosphere, for it may have a far greater influence on his career than any increase in salary can have.

EASY TO TELL.

ONE: "How do you know he is the most important man in the office."

TWO: "Why, he slams the door the hardest and walks the heaviest of any body in the office."

A FACT NOT GENERALLY KNOWN.

It is a fact not generally known that the first passenger elevator in the world was erected in the Fifth Avenue Hotel, New York City.

According to recent well authenticated reports, the Fifth Avenue Hotel is soon to make place for a new skyscraper.

MODERN SHAKESPEARE ON CREDIT.

The following from the *British and Colonial Printer and Stationer*, an English trade journal, under the above head, inclines one to the belief that business conditions are the same the world over:

TO SELL OR NOT TO SELL.

(Hamlet's Soliloquy in its commercial application.)

To sell or not to sell?
That is the question.
Whether 'tis better to send the goods
And take the risk of doubtful payment.
Or to make sure of what is in possession,
And declining , hold them.
To sell, to ship, perchance to lose—
Aye, there's the rub!
For when the goods are gone
What charm can win them back
From slippery debtors?
Will bills be paid when due?
Or will the time stretch out till crack of doom?
What of assignments, what of relatives,
What of uncles, aunts and mothers-in-law,
With claims for borrowed money?
What of exemptions, bills of sale, and the compromise
That coolly offers a shilling a pound?
And of lawyers' fees,
That eat up even this poor pittance?

—*Credit Men's Bulletin.*

GRAPHITE GREASE FOR HYDRANTS.

EUREKA SPRINGS, Ark., March 22, 1907.

Joseph Dixon Crucible Company,
Jersey City, N. J.

Dear Sirs:—Please ship by Wells Fargo Express, at once,
One (1) only, 25 pound firkin Graphite Grease, for hydrants,
" (1) " 5 " can No. 694 Pipe-Joint Compound.

In regard to samples sent me some time ago, will say the fire hydrant grease is all that you claim for it and I can open and close a hydrant (having a hundred twenty five pounds pressure against it) with one hand, while it required both hands before using the grease.

You should put it before the plumbing fraternity also, for it's the best thing imaginable on ball cock stems, bibbs, yard hydrant screws and boiler unions, as the grating, roaring noises caused in former article, are entirely overcome, I having thoroughly tested the matter in past six months.

Yours very truly,
A. MONAGANS,
Supt. City Water Works.

METAPHORS FROM METALS.

"It is most amazing," said a metallurgist,"how the world relies on metals for its metaphors and similes.

"Thus, an orator is silver-tongued or golden-mouthed. An explorer is bronzed by African suns. A resolute chap has an iron will. A sluggard moves with leaden feet. An ostrich has a copper-lined stomach. A millionaire has tin. A swindler is as slippery as quicksilver. A borrower has brass."

—*New Orleans Times-Democrat.*

THE BLOWING UP OF THE DUPONT POWDER MILLS.

Frightful Casualties. Many Killed, Scores Maimed for Life.

A horrifying accident occurred at the powder factory of the Dupont Company, located in Fontanet, Indiana. The various buildings constituting the factory were reduced to scattered piles of ashes, and the soil itself was ground up so fine that rescuers sank to their shoe tops in it. So great was the force of the explosion that even the town was damaged to a marked extent, and tents of the State militia were supplied to furnish shelter for the homeless.

The cause of the disaster, as reported by one of the workmen after he was restored to consciousness at the hospital, was a hot box. "The day before," he said "we had to throw water on it when friction made it hot, this time it got too hot and sent off sparks that caused the explosion."

That's the whole story: a hot box—but it resulted in a heavy loss of life and property. Fortunately, the results of hot boxes are rarely as dire as they proved in this case, but there is always the *chance* of loss in every case. It may be the ruining of the bearing or journal, it may be the tieing up of the plant for hours, it may be a fire that destroys a portion or all of the plant—no one can foretell exactly what the result of *any* hot box may be.

The successful eliminate chance at every possible point. For this reason fire insurance is taken out; not that a fire is planned for, but it *may* occur and the best policy is to avoid the *chance* of loss.

Now the best insurance against the occurance of hot boxes is Dixon's Flake Graphite. A plain oil or grease *may* provide sufficient lubrication, but there is always a *chance* that it will not. Chance is entirely eliminated if Dixon's Flake Graphite, the "positive principle" lubricant, is used. The thin, smooth flakes "buff" the surfaces of the journal and bearing, reducing their microscropic roughness to a minimum, and substituting a graphite-to-graphite contact for a metal-to-metal contact. In the presence of even a small quantity of Dixon's Flake Graphite over-heating is absolutely impossible, there is no *chance* element to be reckoned with.

This property of Dixon's Flake Graphite has been demonstrated practically again and again. It is supported by irrefutable testimony of many engineers who do not leave the fate of the plants of which they have charge at the caprice of *chance*.

All those who want to *know* that there will be no hot boxes, scored journals, or other friction troubles in the machine, engine, or plant for which they are responsible, use Dixon's Flake Graphite. Those who do not know what this lubricant will do should send for the evidence that will be found in the Dixon booklet, "Graphite as a Lubricant" and also a free sample.

If I knew you and you knew me,
  If both of us could clearly see,
And with an inner sight divine
  The meaning of your heart and mine,
I'm sure that we would differ less
  And clasp our hands in friendliness;
Our thoughts would pleasantly agree
  If I knew you and you knew me.

—*Nixon Waterman.*

SAND BLASTS IN BRIDGE PAINTING.

The application of the sand blast in the process of repainting steel bridges has considerably reduced the cost of labor and made possible better results by thoroughly removing rust and foreign materials from the steel. In order to obtain the best results out of any paint it is essential that all the bridge members be free from rust, scale, dirt, greases, etc.

Previous to the use of sand blasts, the common method of cleaning bridge members was by hand. The method was unsatisfactory for the reason that the cleaners could not cover as much surface as the painters and, consequently, the tendency for the cleaners was to neglect their work in order to keep ahead of the painters. This practice resulted eventually in breaking the continuity of the coat of paint and allowed the moisture and gases of the atmosphere to come in contact with the metal. On this account oxidation of the steel occurred in places where the paint remained intact.

In the use of the sand blast experience has taught us that, for ordinary work, an air pressure of 80 pounds per square inch is ample and efficient, removing all objectionable substance from the steel. Comparative tests with different air pressures using the same size of nozzle, were made with the following results: At 60 pounds pressure, the rate of cleaning was 10 square feet in 7 minutes or nearly 1½ square feet per minute; at 80 pounds, it was 10 square feet in 3¼ minutes or 3 square feet per minute, and at 100 pounds, it was 3⅓ square feet per minute. These tests have shown that the 80-pound pressure previously mentiond, gave the most economical working pressure. To secure the best results, this pressure should be constant and, in case the air supply is taken from the main that supplies other injectors, it is good practise to install a small receiver about 18 inches by 36 inches in the air main. This receiver has a tendency to give a steady pressure and to catch any condensation from the air. The condensation can easily be drawn from the receiver.

An advantage of sand blasting is that it secures strong adhesion of the paint on account of the thoroughness of the cleaning, especially upon metal surfaces that have been pitted by rust. Re-entrant angles and difficult corners that cannot be reached by hand are also readily cleaned by this method.

—*Railway Engineering & Maintenance of Way.*

Dixon's Paint Department earnestly advocates sand blasting in bridge painting, and we are confident that the readers of GRAPHITE will be interested in the above well written article on the best practise in the quantity of air pressure nesessary to properly remove foreign substances from the steel prior to the application of paint.

In sand blasting, preparatory to painting, it is of the greatest importance that only sufficient surface be cleaned each day which can be coated on that day, so that the surface will be free of moisture and insipid rust.

Sand blasting of railroad bridges is generally practised by the large railroads, and it is only a matter of time until this good practise will be adopted for the painting of municipal and county bridges.

A metal surface properly cleaned by sand blasting and given two good coats of Dixon's Silica-Graphite Paint, the second coat of a different color from the first coat, will be well protected from rust for many years.

MANY UNIQUE EXHIBITS SEEN AT THE RAILWAY CONVENTION

That Of Dixons Graphite Co. Novel—Many People Attracted By Car

The exhibit at the Railway Association on the Steel Pier has been productive of some novel exhibits, and none have received more attention than that of the Dixon Graphite Company, who have in their exhibit a car built by George Stephenson in New York many years ago, and which has been in continuous use for nearly half a century.

The interior of the car is lined with mirrors of various shapes and contorted reflections, and is the cause of much amusement for the guests of the exhibition, proving one of the great attractions of the convention.

The Dixon Company is noted for its unique exhibits, and at the last convention held at Columbus exhibited the largest paint can in the world, which was also lined with mirrors, attracting thousands of visitors, who were enabled by means of a door in the can to enter.

The Dixon Company has also an exhibit on the beach near the pier in the shape of a sand model of the car and other novel features.

The company manufactures not only the well known Dixon pencils, but plumbago crucibles, graphite Curb grease, lubricants, and the Dixon silica graphite paints, for the preservation and prevention of rust of iron and steel work.

The tower of the Atlantic City Light House was painted with this paint, as well as the iron structural work of many of the largest hotels in the city They manufacture forty-two different grades of graphite, obtaining their material from all portions of the world. They have sold in the past year 100,000,000 pencils, of 1100 different styles and grades.

One may well be thankful that the world does not see him as he sees himself in the mirrors of the Dixon exhibit. The man who conceived the dea of these novel exhibits is Chas. H. Spotts, of the Dixon Crucible Company. The first products of the company when it started in business many years ago were crucibles.

The booth of the company is beautifully decorated in the national colors, and illuminated with red, white and blue electric lights. Small electrical fountains play at each corner of the exhibit.

Atlantic Review, Oct. 16, '07

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the city.

DIXON EXHIBITOR VICTIM OF HOAX

Director Charles H. Spotts, of the Dixon Crucible Company exhibit on the Steel Pier, was the victim of a practical joke last Monday evening.

He had worked hard all day, and was just sitting down to an appetizing roast at the Jackson Hotel when a bell boy hurried into the dining room excitedly and spotting Spotts ejaculated incoherently: Somebody wants you all on de phone immejit!" Dropping his fork Mr. Spotts rushed to the phone and was told that the car, which was on exhibit by the Dixon Company, had run off the platform and killed a boy.

It took Mr. Spotts two seconds to reach his hat and three bounds to get on the street. Then he ran.

Arriving at the pier he rushed frantically to the exhibit stall, only to find the car safely on the platform and no one in sight but the watchman. He had been the victim of a practical joke by "one of the boys."

The convention is not yet over, and Manager Spotts is pondering deeply.

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point to a successful winter season.

STALL DRAPED IN BLACK IN MEMORY OF "DEAD BOY"

"To the beloved little Mack, run over by the Dixon car," reads an inscription on a band of crepe over the booth of the Dearborn Drug and Chemical exhibit at the pier. "Little Mack" is the manager of the exhibits.

The story runs this way: Little Mack telephoned to Manager Spotts of the Dixon exhibit Monday evening that his car had killed a boy, and when Mr. Spotts arrived he found he was the victim of a practical joke. A little sly detective work unearthed the perpetrator, and now the laugh is on Little Mack.

Atlantic Review, Oct 17, '07